THE AMERICAN JOURNAL OF PHARMACY.

JULY, 1879.

VERATRUM VIRIDE—NOTES OF AN EXAMINATION.

BY CHARLES BULLOCK.

When the root of veratrum viride is digested in water acidulated with sulphuric acid at a temperature of 150°F., the mass becomes gelatinous and swells up to an increased bulk. When expressed and alcohol is added to the expressed liquor, a copious deposit of pectic acid is occasioned.

The presence of pectose and the large amount of resin and fatty matter contained in the root makes the use of alcohol necessary for its exhaustion.

Fifty-three pounds of veratrum viride—rhizome with rootlets—from North Carolina, in powder, was exhausted with alcohol, the alcohol distilled off and the resulting extract exposed to a continued moderate heat until all of the alcohol was expelled. During this process the resin separated from the soft extract. It was removed and allowed to drain for several weeks during the warm weather of summer.

The weight of the soft extract was . .	6 lbs. 10¼ oz. av'd.
The weight of the hard resin was . .	3 " 4
Total weight of extract from 53 lbs. of root,	9 lbs. 14¼

This extract furnished the material for examination.

In separating the alkaloids, advantage was taken of the previously-ascertained fact that *all* of the alkaloids were imperfectly precipitated from acid solutions by caustic alkalies or alkaline carbonates at ordinary temperatures, but if the solution is heated to 150°F., the precipitation is almost complete.

The Soft Extract.—Eighty-six per cent. of this extract is soluble in water. Petroleum benzin removes 4·3 per cent. of fatty matter. After removal of the alkaloids, the watery solution was treated in the usual manner with subacetate of lead, and after separating the excess

of lead and neutralizing the free acid with carbonate of baryta, the filtered solution was evaporated to a syrup and thrown into alcohol. The filtered alcohol solution, evaporated and exposed to a temperature of 212°F. until it ceased to lose weight, gave a product representing 85·5 per cent. of the extract.

This product has a transparent red color, a saccharine taste, with some bitterness, and acts energetically as a reducing agent with salts of copper and silver. In chemical character it appears to be almost entirely glucose.

The amount of alkaloids contained in this extract was determined for the portion soluble in water and for the resin separately.

880 grains of the extract, representing the yield from one pound of root, was exhausted with water, the washings were evaporated to reduce the volume and carbonate of soda added to alkaline reaction. After separating the precipitate, the solution was heated to 150°F. and a little caustic soda added. The precipitate occasioned was removed while the solution was warm.

The weight of the first precipitate by carbonate of soda was	16·7 grains.
The second, by caustic soda, was	2·6
Total, ...	19·3

These alkaloids contained a large amount of coloring matter, from which they were purified by re-solution in acetic acid, filtering and precipitation from a warm solution. The precipitate, when dry, weighed 10·7 grains.

All of the mother-waters were made acid and evaporated, then made alkaline and treated with ether. The ether product was dissolved in acetic acid, filtered and precipitated as before. Weight of product, 1·7 grain; total weight of mixed alkaloids, 12·4 grains.

The jervia was separated by precipitation, as a nitrate, from an acetic solution representing 3 grains in each fluidounce, by addition of an equal volume of a saturated solution of nitrate of potassium. After standing 6 hours, the nitrate of jervia was collected on a filter and washed with a solution of nitrate of potassium, pressed between folds of bibulous paper and dried. Weight of nitrate of jervia, 7·9 grains. After the separation of the jervia the solution was evaporated, heated to 150°F. and precipitated by soda. Weight of other alkaloids, 3·2 grains.

Resin from the Soft Extract.—To prevent any change which might be caused in saponifying the resin with lime, the following process was adopted with this, as also, subsequently, with the hard resin :

The fatty matter was removed by petroleum benzin. The resin, rubbed to a fine powder, was made into a smooth paste with water, introduced into a bottle and a solution of carbonate of soda containing a little caustic soda added until the resin was dissolved. It was then agitated with ether and the ether removed. The washing with ether was then repeated. The product left on distillation of the ether was dissolved in acetic acid, filtered and precipitated by carbonate of soda containing a little caustic soda. Weight of product, 9·3 grains.

The mother-water was made acid, evaporated, and after being made alkaline, treated with ether. The product, dissolved in acetic acid, filtered and precipitated, gave 0·7 grain more of alkaloids. Total weight of mixed alkaloids from the resin, 10 grains.

The alkaloids separated by nitrate of potassium gave

Nitrate of jervia, ...	8·4 grains.
Other alkaloids, ...	1·6

Hard Resin.—429 grains, representing the yield from one pound of root, was powdered and digested in petroleum benzin. The loss of weight, representing fatty matter, was 84·7 grains. After removal of the benzin by evaporation, the resin was reduced to a fine powder and treated as in the previous experiment, by dissolving it in an alkaline solution and treating the solution with ether. The weight of mixed alkaloids obtained was 22·5 grains. The mother-water was made acid, evaporated, and, after addition of caustic soda, treated with ether. The product obtained weighed 0·8 grain. The alkaloids, separated in the manner preceding, gave

Nitrate of jervia, ...	14·1 grains.
Other alkaloids, ...	6·1

The resin from the soft extract and the hard resin were then precipitated from their alkaline solution by hydrochloric acid, and dried. The solution was made neutral with soda and evaporated to dryness. This product was added to the precipitated resin and the whole mixed with an equal weight of lime previously slaked, and the mixture boiled for a few minutes, then evaporated to dryness by steam heat. The dry mass was powdered and exhausted by hot alcohol. The product left on distillation of the alcohol was dissolved in diluted acetic

acid, filtered and precipitated. Weight of mixed alkaloids obtained, 0·9 grain. The alkaloids, separated as before, gave

Nitrate of jervia, ...	0·1 grain.
Other alkaloids, ...	0.8

The *total* amount of alkaloids obtained from the extract representing one pound of root, was

From soft extract, ...	12·4 grains.
Resin from soft extract, . . .	10
Hard resin, ...	24·2
Total yield of mixed alkaloids, . .	46·6

When separated, the alkaloids represented

	From soft extract.	Resin from soft extract.	Hard resin.
Nitrate of jervia,	7·9 grains.	8·4 grains.	14.9 grains.
Other alkaloids,	3·2	1·6	6·2

Total amount of nitrate of jervia, . . .	31·2 grains.
" other alkaloids, . .	11·0
	42·2
Loss, ...	4.4
	46·6

The loss of over 10 per cent. which occurred in separating the alkaloids is due both to separation of foreign matter and loss in manipulation.

An examination under the microscope of the alkaloids, after separation of the jervia, was made by allowing a drop of their alcoholic solution to evaporate on a glass slide. Crystalline forms were found, differing in form from jervia, indicating the probable presence of another alkaloid which crystallizes from its alcoholic solution. When further purified by solution in ether, dissolving the ether product in acetic acid and precipitating by nitrate of potassium until a solution containing 1 part in 200 of acetic solution was no longer disturbed by addition of the nitrate, then precipitating the solution at 150°F. by caustic soda, a product representing five per cent. of the mixed alkaloids was obtained.

Saponification of the Resin by Lime.—One pound avoirdupois of the hard resin was powdered and rubbed into a smooth paste with 1 pound of lime previously slaked. Sufficient water was added and the mixture boiled for a few minutes. After evaporation and drying on a steam-bath, the mass was powdered and exhausted with three gallons of hot alcohol. The product left on distillation of the alcohol was

treated with warm diluted acetic acid,[1] filtered and precipitated while warm by caustic soda. The precipitate was purified by drying, re-solution and precipitation. The weight of mixed alkaloids obtained was 485 grains.

A better result was obtained from a second pound of the resin, by first removing the fatty matter with benzin and using two pounds of lime. The yield of alkaloids by the process of saponifying with lime was 20 per cent. greater than by the ether process.

Volatile Principles.—300 grains of the hard resin, deprived of fatty matter, was dissolved in water by addition of carbonate of soda mixed with a little caustic soda. The alkaline solution was submitted to distillation, collecting the product in a receiver containing water acidulated with acetic acid. The distillate was evaporated to reduce its volume, made alkaline and treated with ether. The result was negative.

NOTE.—After concluding the examination recited in this paper, I have seen the abstract of a paper read by Dr. Wright before the Chemical Society, London, May 15th, "On the Alkaloids of Veratrum Viride," in which the able and exhaustive examinations made by him contribute greatly to our knowledge of the constituents of this interesting drug. The name "rubijervine" has been given by him to the alkaloid which has claimed my attention, a name which is very appropriate to the reactions of the alkaloid. The alkaloid which I found to crystallize from solution in alcohol along with "rubijervine" is probably his "pseudojervine."

The large amount of alkaloids which are associated with the resin, and removed from it only by saponifying with lime, render it probable that by his process of obtaining the alkaloids a considerable amount escaped his notice.

The approximate yield of the bases which I obtained from one pound avoirdupois of the root by the ether process was 46·6 grains = 6·612 grams per kilo. The amount obtained by Dr. Wright was 0·80 gram per kilo.

The amount obtained from *the hard resin alone* by saponifying with lime represented 29·7 grains for one pound of root = 4·21 grams per kilo.

[1] Repeated treatment with hot water containing acetic acid until two gallons were used was necessary to exhaust the product.

Philadelphia, June 6, 1879. (To be continued.)

ANALYSIS OF EUPATORIUM PERFOLIATUM, Lin.

Reported by PETER COLLIER, Chemist, to Hon. Wm. G. LeDuc, Commissioner, Department of Agriculture, Washington, D. C., June 5th, 1879.

I have the honor to report the following result of the examination of "Boneset," *Eupatorium perfoliatum*. This plant has long had the reputation in domestic medicine of being a good tonic, especially valuable in the spring. Physicians also have attributed to it virtues as a diaphoretic, expectorant, emetic and anti-intermittent. Whether all claimed for it is true must be settled by the physician, but the present chemical examination has been undertaken with the hope of throwing some light upon the proximate principles to which are due the medicinal effects of the herb. Partial analyses have been made by W. Peterson ("Amer. Jour. Pharm.," 1851, xxiii, p. 206) and by M. H. Bickley ("Amer. Jour. Pharm.," 1854, xxvi, p. 459).

Probably the bitter principle is the only one of medicinal importance. It is a brown uncrystallizable substance, soluble in water and alcohol, insoluble in ether. It was impossible to purify this substance well.

Upon evaporation of an alcoholic extract of the drug a few white prismatic crystals were deposited. These crystals were difficultly soluble in hot alcohol, and insoluble in ether, water, dilute acids and dilute alkalies. They seem, therefore, to be neither acid nor alkaloid, but rather of an indifferent character.

The drug appears to contain very little volatile oil, although its odor may be accounted for by this small amount present.

Starch is not abundant. The tannic acid found gave the usual reactions, except that it failed to precipitate tartar emetic from its aqueous solution. The albuminoids were calculated from total nitrogen, multiplied by 6·25.

It is impossible to say whether sugar was present in the substance, since the bitter principle would probably give similar reactions.

The following analysis is regarded as an approximation only, but care has been taken to eliminate all preventable errors. The analysis was made by Mr. Parsons, who also submits the above report.

Analysis of "Boneset," Eupatorium Perfoliatum.

Water,	9·17 per cent.
Ash,	7·51
Albuminoids,	13·30
Resins and chlorophyll,	15·15
Indifferent crystalline substance,	2·87
Tannic acid,	5·04
Bitter extractive,	18·84
Gum and coloring matter,	7·23
Starch isomers,	12·47
Cellulose,	9·32
Humus substances,	traces
Volatile oil,	traces
	100·90 per cent.

LACTUCARIUM FROM LACTUCA CANADENSIS.

BY HILAND FLOWERS, PH.G.

(*Abstract from an Inaugural Essay.*)

The milk-juice, which exudes almost at the commencement of the plant's career, is perfectly inert, though a large quantity is produced. As collected up to July 20th, the exudation has a strong narcotic odor, while the palate perceives no bitterness, but simply a flat sweetish taste. Up to this time the plant has borne its reproductive organs, but failed in giving the requisite bitterness. A change, however, occurred about the 25th of July, when we find that the laticiferous vessels are yielding a large supply of juice with a slightly bitter taste and a stronger and more lasting odor. As the season advances, both the bitter principle and the narcotic odor increase.

The milk-juice collected during the latter part of the season dried in irregular masses, crumbling into minute fragments when rubbed between the fingers, and was of a blackish-brown color, a strong odor and very bitter taste. If kept in a closely-corked bottle it remains soft and is capable of being moulded into cakes. The odor is slightly stronger in the fresh state, and the color of a grayish-brown.

Aubergier, in 1843, experimented upon this plant, while investigating the subject to ascertain from which lactucarium might be most advantageously obtained; he stated that the milk-juice of *Lactuca canaden-*

sis, or elongata, had a flat, sweetish taste and contained mannit, etc., but *no* bitter principle.

In September, 1867, Prof. Maisch commenced a series of experiments upon the plant, and upon the personal observation then made, as well as the reports of Doctors DaCosta and Muller, of this city, rested convinced that the plant did contain a bitter principle and did possess decidedly medicinal properties, and that Aubergier had perhaps improperly conducted his experiments, possibly using the expressed juice of the plant, which, according to Prof. Maisch (*vide* "American Journal of Pharmacy," 1869, page 145), has a flat, sweetish taste.

Four drachms of the milk-juice collected in September and October were exhausted upon a filter with boiling alcohol. Eight ounces of filtrate were obtained, passed through animal charcoal and concentrated by spontaneous evaporation, when inodorous and tasteless needles were obtained, which melted at about 175°F. and on cooling congealed to a granular mass. They were evidently *lactucerin*. On still further evaporating the mother liquor and adding to it water, a whitish precipitate was produced, from which the aqueous liquor was thoroughly drained. On dissolving the precipitate in boiling alcohol and evaporating the solution spontaneously, more of the tasteless needles were obtained, and pale-brownish bitter scales, which were evidently impure *lactucin*.

The aqueous mother liquor was precipitated by basic acetate of lead, and both the precipitate and the filtrate were freed from lead by sulphuretted hydrogen. On evaporating the solutions, brownish amorphous masses, having a bitter taste, were left, corresponding to the *lactucic acid* and *lactucopicrin* of the European lactucarium.

Lactucerin is in colorless needle-shaped crystals, either united in stellate groups or crossing and overlapping each other; tasteless, soluble in boiling alcohol, petroleum benzin, ether, chloroform, and slightly soluble in cold alcohol; insoluble in water. If heated to above its melting point (175°F.), it volatilizes slowly. Sulphuric acid chars it; nitric acid has no effect unless heated.

Lactucin is insoluble, or nearly so, in water; soluble in alcohol and acetic acid. When pure and not exposed to much heat, the lactucin is in scales of a dull-white cast; under the microscope presents a rugged surface, slightly tinged with a reddish-brown color. From my experience, I am inclined to think that if the scales are heated in solution for some time, they will not form again very readily and are

deprived of some of their bitterness. Ammonia will not precipitate it, but rather tends to alter the taste. It is, however, precipitated from alcohol by water, and may thus be purified by repeated precipitation and crystallization. Nitric acid will not dissolve it, nor will the addition of alcohol facilitate this end. The characteristics given by Kromayer, Ludwig and Walz are in accordance with these results.

Lactucic acid is precipitated by basic acetate of lead, care being taken that an excess is not used, for it is soluble in that salt when in excess. It changes blue litmus paper to red, proving its acidity; has an acrid, bitter taste; is soluble in alcohol, both hot and cold, insoluble in petroleum benzin, bisulphide of carbon, ether and chloroform, and has a brownish-green color.

Lactucopicrin is a brown amorphous mass, and may be purified by repeated treatment with ether, chloroform or alcohol, filtering and evaporating. It has a strong and purely bitter taste, is soluble in alcohol, chloroform, ether and water, and is not precipitated by lead salts from its solution.

The residue of the lactucarium, left after the above principles had been removed by hot alcohol, was treated with bisulphide of carbon, which dissolved a large amount of caoutchouc (*gum elastic*), but there yet remained a residue, which was treated with ether, removing a pale-yellowish granular powder; with chloroform, removing the remaining caoutchouc and some of the coloring matter, and with alcohol, which yielded, on evaporation, a brownish, bitter, amorphous mass resembling lactucopicrin. Water extracted a large amount of coloring matter. The residue which was now left defied the solvent powers of carbon-disulphide, ether, chloroform, alcohol, water and acetic acid.

The yellowish powder obtained on the evaporation of ether in the above treatment closely resembles lactucerin, but the identity of the two was not proven. When heated it will melt, and volatilize if the temperature is increased. On cooling it forms a resinous mass. It is soluble in hot alcohol, petroleum benzin and chloroform; insoluble in hot or cold water. Sulphuric acid dissolves it, but does not char it. Nitric acid has little or no effect. Muriatic acid dissolves it slightly. Acetic acid and ammonia have no effect. It is precipitated from the alcoholic solution by water.

The statement of Aubergier regarding the worthlessness of this plant is undoubtedly wrong, as there exist, beyond question, several

bitter principles with decided physiological action. It is very likely that he collected the juice before the plants were sufficiently matured and the bitter principles developed.

THE PRODUCTS OF RICINUS COMMUNIS, Lin.

By Ernest P. Raab, Ph.G.

(*From an Inaugural Essay.*)

After describing the plant, its culture in the United States and the processes adopted in different countries for obtaining the fixed oil, the author followed Bœrner's experiments ("Am. Jour. Phar.," 1876, p. 481), with a few modifications, using the residuary oil-cake after the second expression.

Having reduced the bean to the proper degree of fineness for percolation, I percolated four ounces each respectively with the following menstrua: benzin, ether, alcohol and bisulphide of carbon. The benzin percolate divided into two strata, the upper being clear benzin, the lower a light-brown oil of spec. grav. ·95. Having dissolved a part of the benzin, 11·4 per cent. oil was obtained. The oil was saponified with pure caustic potassa, giving a soft brown soap, and, upon filtration, nothing but brown extractive was left behind. The portion percolated with benzin was again percolated with bisulphide of carbon, furnishing a light-brown oil, but no crystals were perceptible on evaporation, and also, when the bisulphide of carbon residue was treated with benzin, the product was only a light-brown oil.

The three other percolates, varying in color—that of alcohol dark-brown, that of ether somewhat lighter and that of bisulphide of carbon still lighter—were put into a Florence flask connected with a Liebig's condenser. The three solvents came over clear, and, on spontaneous evaporation, left a slight greasy spot in the evaporating dish. The residuary portion was shaken up with ether, which dissolved the oil; the remainder was shaken up with alcohol, filtered and concentrated. The bisulphide of carbon and ether residue left a brown extract, but the alcohol extract was soon studded with prismatic, needle-shaped light-brown crystals. Upon dissolving these in boiling alcohol, filtering, concentrating and evaporating, white prismatic crystals were left having a burning taste, insoluble in cold water and alcohol, soluble in

boiling alcohol and water, slowly soluble in hot and cold ether, readily soluble in hot or cold benzin, insoluble in benzol.

Next Tuson's process was followed. Half a pound of the bean was boiled with successive portions of water. The decoction had an acid reaction, was strained and evaporated. The soft extract was dissolved in boiling alcohol. As soon as the alcohol was added a brown deposit was thrown down. This was partially soluble in cold, more so in hot water, sparingly soluble in acetic acid and acetic ether, insoluble in alcohol, diluted alcohol, benzin, chloroform, bisulphide of carbon and benzol. Upon examining the deposit, it proved to be gum, pectin, sugar, extractive, etc. In order to ascertain whether or not it contained any purgative properties, five drachms were given to a cat, without any perceptible results. Filtering the solution, condensing and allowing it to evaporate, no crystals were obtained. Again dissolved in boiling alcohol, a brown extract remained. This was separated by filtration, the filtrate evaporated, and, as no crystals were deposited, the filtrate, mixed with magnesia, was evaporated to dryness, exhausted with boiling alcohol, filtered and allowed to evaporate. A few tabular crystals were left; the yield was very small, only 12 or 13 grains. Thinking the second boiling with alcohol was the cause of the small amount, the experiment was repeated with three pounds more of the bean. The yield this time was almost 2 drachms of tabular prismatic crystals. The crystals obtained corresponded with those obtained by Bœrner in regard to solubility in hot water, acidulated solution with phosphomolybdic acid, tannic acid and iodohydrargyrate of potassium, proving the product not to be an alkaloid.

A portion of the decoction was neutralized with bicarbonate of sodium, which immediately changed the color from dark-brown to port-wine red. To the red solution bicarbonate of sodium was added in excess, but no further results were obtained. A hot alcoholic solution of the extract previously obtained was mixed with one ounce of ether, which immediately deposited a white amorphous powder mixed with extractive. The powder, though white when deposited, changed to brown on standing several days. It proved to be insoluble in cold water, alcohol and in cold or hot ether, but soluble in hot water and alcohol to a limited extent, sparingly soluble in benzin and bisulphide of carbon. In order to ascertain whether this contained sugar or not,

Trommer's test was applied, but only a ropy, dark-brown deposit ensued, changing to black.

A portion of the alcoholic extract was treated with six ounces of acetic acid, which dissolved some of it; boiling caused more of it to be taken up. This solution was filtered; the filtered liquid was allowed to evaporate spontaneously. In a few days needle-shaped crystals were produced having a brown color, probably from an admixture of extractive matter. But the crystals were very deliquescent, had a burning, bitter, acrid taste and were readily soluble on the tongue. Crystals closely resembling the former, but not deliquescent, were obtained by treating another portion of the alcoholic extract with acetic ether. The brown extract left on the filter was partially soluble in alcohol, ether and chloroform, but not soluble in benzin, benzol and bisulphide of carbon. The three pounds of bean which had been used for the production of ricinin were lastly boiled with one and one-half gallon of water and placed into an earthenware jar for four weeks. After the fourth day a peculiar odor, resembling that of foul fecal matter, was developed, not like the infusion of Bœrner, recalling that of decayed cheese. Day by day this odor grew more intense. On the fourth day, also, a marked acid reaction was perceptible. On the twenty-eighth day it was neutralized with bicarbonate of sodium and evaporated. The product, resembling crystals of butyrate of sodium, amounted to 9 ounces and 2 drachms. One pound each of alcohol and sulphuric acid were mixed, allowed to cool and then poured upon the butyrate of sodium previously placed into a copper still. Heat being applied, vapors having the characteristic smell of butyric ether were observed. The vapors were followed by drops of an alcoholic solution of butyric ether. The yield was 19½ ounces. On shaking 2 drachms with an equal weight of water, the pure butyric ether floated on top. To estimate the exact yield, 20 cc. of the liquid obtained and 20 cc. of water were placed into a graduated tube and thoroughly shaken. Taking in consideration the 10 per cent. of ether dissolved in the water, the result was 27·3 per cent of pure butyric ether.

Following the experiments of Prof. Wayne ("Amer. Jour. Phar.," 1874, p 85), the leaves of two plants were dried, ground and sifted, yielding 8 troyounces. On percolating 4 troyounces of these with 95 per cent. alcohol, a grass-green (not brown) liquid was obtained. After

adding a solution of lead acetate, sulphuretted hydrogen was passed through the liquid, the light-green filtrate was evaporated to a soft extract and exhausted by boiling alcohol. This, when allowed to evaporate spontaneously, left merely green extract. The extract was again treated with boiling water, allowed to cool and then passed through animal charcoal to separate coloring matter. On evaporating, tabular crystals were produced, corresponding in appearance and behavior to those obtained from the beans. The green coloring matter was extracted from the charcoal by boiling alcohol and allowed to evaporate. The extract left was insoluble in cold and boiling water, in ether and sparingly soluble in cold alcohol. The remaining 4 ounces of the leaves were boiled with water. The greenish-brown decoctions were strained and evaporated to a soft extract. This was exhausted by boiling alcohol, which immediately caused a deposit of a green extractive matter similar to that obtained from the beans and having the same solubilities. The light-green alcoholic filtrate was condensed and allowed to evaporate. As no crystals appeared, the extract was treated with cold alcohol and the filtrate heated to the boiling point and allowed to evaporate spontaneously, when beautiful tabular prisms were obtained of a greenish hue. After solution in alcohol, filtration through animal charcoal and subsequent concentration, the substance was deposited in white needle-shaped crystals.

Applying the tests enumerated by Prof. Wayne to these crystals, identical results were obtained in every case.

ON THE PREPARATION of SYRUP of IPECACUANHA.

By E. G. Bissell, Ph.G.

Read before the New York State Pharmaceutical Association, May 22, 1879.

Having long been dissatisfied with the syrup of ipecac, produced by the present officinal formula, I have made an attempt to so modify the process as to produce a better result, and take pleasure in presenting my experiments in the hope that I may call out discussion and further experiment by others.

There seem to be two great objections to the present article: First, soon after making it separates quite a large flocculent precipitate, giving the syrup a very inelegant and suspicious appearance, and, secondly, this precipitate carries down with it a portion of emetia, thus materially

impairing the efficiency of the preparation, unless it is always well shaken before being administered, a precaution very likely to be neglected by the average consumer. I have even known drug clerks to omit shaking the bottle before dispensing the syrup.

About the only recommendation the present formula seems to have is that the article is easy to make; this is certainly a very insufficient reason for retaining the formula when one can be divised which, with but a reasonable amount of trouble, produces much better results.

When fluid extract of ipecac is mixed with water a precipitate of the resinous portion of the drug takes place, carrying down with it a portion of emetia; the precipitation of the entire amount of resinous portion, however, does not at once take place; to accomplish that result the mixture must stand at rest two days, or thereabouts. Now in order to produce from the fluid extract a syrup of ipecac, free from the objections of the officinal article, we must first entirely free the fluid extract used in the process from that portion insoluble in water, producing the objectionable precipitate in the syrup. And, next, in order that the syrup may fully represent the emetic properties of the drug, we must dissolve the emetin, which is unavoidably carried down, and add it to the syrup.

The writer thinks the above conditions are complied with, and an unobjectionable article is produced by the following process: One fluidounce of fluid extract of ipecac is mixed with four fluidounces of distilled water, and the mixture allowed to stand at rest 48 hours. Put 13 troyounces of best white granulated sugar into a flask of not less than one pint capacity, then pour off as much of the aqueous solution of ipecac as can be turned perfectly clear and add it to the sugar within the flask, introduce into the neck of the flask a funnel containing a double paper filter previously well wetted with water and drained. This double filter is made by introducing one plain filter, folded in the usual way, into another in such a manner that the three thickness side of each shall coincide with the one thickness side of the other. Next thoroughly shake up the remaining dregs left after pouring off the clear solution of ipecac, and put it, a little at a time, upon the filter and allow it to drain into the flask; then rinse the vessel, from which the dregs have been poured, with two fluidounces of hot distilled water in several small portions, and pour the rinsings one after another upon the precipitate in the filter, wash the precipitate with the remaining two

fluidounces of hot water, allowing the washings to mingle with the contents of the flask, then warm the flask until the sugar is all dissolved, and when cold add sufficient distilled water to make the syrup measure one pint.

Two fluidounces of hot water are quite sufficient to remove all the emetia from the precipitate, provided the washing is done with ordinary skill and care, as may be shown by testing the washings with tannic acid, or nitrate of potassium. The writer has tried several experiments in making syrup of ipecac, and the formula presented produces the most perfect article of any process tried by him; some of the syrup so made several weeks ago as yet shows no sign whatever of separating, but whether it will stand the test of time as well as he expects, of course, can not as yet be definitely determined. An article prepared by this method last January, except that the mixture of fluid extract and water was allowed to stand only 24 hours, showed slight floccula diffused through it after standing several days, which floccula did not increase or go to the bottom, and the syrup still remains a nearly perfect article.

Another article prepared by mixing one fluidounce of fluid extract of ipecac with six of distilled water, at once filtering, then dissolving the requisite amount of sugar in the mixture, soon after separated a considerable precipitate, although the article was much better, in this respect, than the officinal.

Still another process was tried, using benzoic acid water in place of distilled water, as suggested in an article on "Benzoic Acid in Pharmacy," published in the "American Journal of Pharmacy," April, 1878. This syrup separated as badly as that produced by the third process mentioned in this article, and the writer can see no use whatever for benzoic acid in syrup of ipecac, and if of no use of course it is objectionable.

In conclusion, allow me to remind the members of this association that the syrup of ipecac is an important preparation, and I would urge others to try the process here recommended, and other processes which may occur to them, with a view of offering a perfect, as a substitute for an imperfect, article to our next Pharmacopœia.

CHEMICAL NOTES.

By Prof. Saml. P. Sadtler.

Inorganic Chemistry.—*On the formation of Ozone by the aid of Hydrocarbons.*—Every chemist knows that alkali metals, preserved under naphtha in stoppered bottles, do not retain their lustre. J. Schiel has made some experiments which explain the matter. A piece of thallium was preserved under petroleum, which had been rectified over sodium, and the bottle stoppered. After several days, the metal, sides and bottom of the bottle, wherever covered by the petroleum, were coated with a brown deposit, which increased in amount and became darker. This could only be explained by the ozonizing of the air shut in the bottle, and the oxydation of the thallium. A test showed that the dark coating was really thallium oxide. A series of experiments showed, moreover, that the hydrocarbons especially had this ozonizing action. Benzol, petroleum-naphtha, petroleum, oil of lavender, oil of turpentine, form a series of compounds with increasing ozonizing effects. Easily oxidizable metals, like lead and iron, are rapidly oxidized when placed under hydrocarbons, connected with the air by a capillary tube passing through the cork of the bottle. The oxide of lead dissolves in petroleum, and colors it a clear yellow. Peroxide of lead does not appear to form under these circumstances. Even so electro negative an element as copper will oxidize under turpentine oil, because of the ozonizing power of the latter.—*Ber. der Chem. Ges.*, xii, p. 507.

H. Köhler has examined into the correctness of the statements made in many of the text-books that *mercuric iodide* fuses at 238°C. to an amber-colored liquid. He finds that different preparations of mercuric iodide examined fuse invariably at 253° to 254°C., and that the color of the fused mass is not amber-colored but always blood-red, resembling bromine. The clear yellow color, which the iodide takes at 150°C., changes as it approaches its fusing point (already at 230°C.) to a deep orange. He finds, moreover, that the best crystallizations of the mercuric iodide are gotten, not from concentrated, nor from dilute nitric acid, but from concentrated hydrochloric acid.—*Ber. der Chem. Ges.*, xii, p. 608.

On the vapor-density of $InCl_3$ and the equivalence of In.—Victor and Carl Meyer, in elaborating their method for vapor-density determination, have incidentally made some very valuable determinations, bearing

upon certain mooted questions. Thus it was not certain whether the chloride of indium had the formula $InCl_3$ or In_2Cl_6, whether indium was to be ranked with zinc, with an atomic weight of 75·6, or with aluminum, with an atomic weight of 113·4. Only a determination of the vapor-density of one of its well-characterized compounds, like the chloride, would decide this. The result was as follows :

Calculated vapor-density for In_2Cl_6, 15·20 ; for $InCl_3$, 7·60 ; experimental vapor-density, 7·87.

The formula of the chloride is, therefore, $InCl_3$ and not In_2Cl_6, and indium does not belong to the chemical group of either aluminum or of iron, both of which form sesquichlorides.—*Ber. der Chem. Ges.*, xii, p. 611.

Organic Chemistry.—*On the Oxydation of Resorcin to Phloroglucin.* —Barth and Schreder have been making experiments upon the phenols with fusing caustic soda. They had found that from ordinary phenol could be prepared a diatomic or even triatomic phenol by the introduction of one or two hydroxyl groups in place of a corresponding number of hydrogen atoms, and they applied the same treatment to resorcin, $C_6H_4(OH)_2$, a diatomic phenol. On fusing it with an excess of commercial caustic soda in a silver crucible, the light-yellow fused mass changed, with effervescing, into a chocolate-colored mixture. The cooled mass was put in dilute sulphuric acid, and after the separation out of some brown amorphous flocks, the clear brown filtrate was extracted with ether, and the etherial solution allowed to crystallize.

The purified crystals were found to be, on examination and analysis, phloroglucin, $C_6H_3(OH)_3$. A small quantity of pyrocatechin, $C_6H_4(OH)_2$, a diatomic phenol was formed at the same time from the resorcin.—*Ber. Chem. Ges.*, xii, p. 503.

On Cantharidin Derivatives.—J. Piccard makes public some interesting results obtained with this relatively little-studied substance. The change of cantharidin into cantharidinic acid, by the aid of hydrogen iodide, he finds to depend upon the formation of an intermediate iodine compound, in which one O atom is replaced by two I atoms. This compound, when boiled with concentrated potassium hydrate in a sealed glass tube, yields a clear oily layer of pure cantharen, C_8H_{12}. This is much purer than the cantharen obtained by heating cantharidinic acid with caustic potassa to 400° to 450°C. It boils perfectly constant at

134°C. If this cantharen be boiled with 10 parts water and 5 parts concentrated nitric aid, in a tube drawn out to a capillary opening, it is oxidized first to orthotoluylic acid and finally to snow-white crystalline phthalic acid. If cantharidin be heated with an excess of penta-sulphide of phosphorus the mass swells up and there distills from it a light oil, which, when rectified over metallic potassium, is found to be pure orthoxylol, C_8H_{10}.—*Ber. der Chem. Ges.*, xii, p. 577.

An Examination of Distilled Essence of Lemon.—In this journal (May, 1879, p. 255), in describing a process for obtaining the distilled essence of lemon, reference is made to a study of this essence by Dr. W. A. Tilden. The results of that study were as follows:

The specimens of oil examined had a sp. gr. of ·852 at 20°; the first rough distillates, after being heated with metallic sodium, gave a distillate boiling under 179°. The following substances were recognized: (1.) A turpentine, $C_{10}H_{16}$, agreeing in general properties with terebenthene. (2.) A terpene, $C_{10}H_{16}$, for which the name *citrene* may be retained, and which constitutes at least 70 per cent. of the crude oil; this terpene differs but slightly from the corresponding terpene of orange as to odor, and it boils at the same temperature, 176°; but it is distinguished by the formation of terpene hydrate when treated with nitric acid and alcohol, whereas hesperidene yields no terpene (hydrate?); citrene treated with strong sulphuric acid yields an inactive hydrocarbon, boiling at about 176°, whilst hesperidene yields viscid products, distilling above 240°. (3.) Cymene about 6 per cent. (4.) Distillates *c* and *d* consist chiefly of an oxidized compound, $C_{10}H_{18}O$, boiling above 200°, resembling terpinol, except that it is dextrorotatory. (5.) The viscid residue consists of polymeric hydrocarbons, $(C_{10}H_{16})_2$, and, also, of a compound ether, $C_{10}H_{17}(C_2H_3O)O$, which is decomposed by heat into $C_{10}H_{16}$ and acetic acid.—*Jour. Chem. Soc.*, May, 1879, p. 386, from *Phar. J. Trans.*

On the Alkaloids on the Aconites.—Wright and Luff have published farther results in their study of the Japanese aconite roots. The alkaloid is called by them japaconitine, and they give to it the formula $C_{66}H_{88}N_2O_{21}$. It melts at 185° to 186°, and closely resembles aconitine. On saponification it splits up into benzoic acid and a new base, japaconine. Japaconine closely resembles aconine, but on treatment with benzoic anhydride it forms a tetra-benzoylated instead of a dibenzoylated derivation.—*Chem. News*, May 23, 1879, p. 224.

Analytical Chemistry.—*Quantitative Determination of Theobromine in Cacao and Chocolate.*—G. Wolfram recommends the following method: If shelled cacao-beans are to be analyzed they are ground up in a hot mortar to a thick paste. 10 grams of this mass, or 20 to 30 grams of chocolate are digested for some time in hot water, treated with ammoniacal lead acetate, filtered whilst hot and washed with hot water until the acidified filtrate ceases to give a precipitate with sodium phospho-tungstate. The filtrate is tested with caustic soda, and the liquid evaporated to 50 cc., acidified with sulphuric acid, and the lead sulphate removed by filtration. The filtate is precipitated with a large excess of sodium phospho-tungstate. The separation of the slimy yellowish-white precipitate, in flakes, is facilitated by warming and stirring the mixture gently. After several hours' standing the liquid is filtered and washed with 6 to 8 per cent. of sulphuric acid. The filter and the precipitate are then treated in a beaker with an excess of caustic baryta, the mixture warmed, the excess of barium hydrate neutralized, by means of sulphuric acid, and any excess of the latter thrown down with barium carbonate. The liquid containing the theobromine in solution is filtered whilst hot, and the precipitate washed with hot water. The filtrate is evaporated in a platinum dish, dried and weighed. Since, besides theobromine, a small quantity of baryta salts is always dissolved in the liquid, the alkaloid is removed by ignition, the residue moistened with ammonium carbonate, evaporated, heated, re-weighed and the difference between the two weighings calculated as theobromine.—*Dingler's Polytech. Jour.*, vol. 230, pp. 240, 241.

GLEANINGS FROM THE GERMAN JOURNALS.

By Louis von Cotzhausen, Ph.G.

Gelatin Globules containing Potassium Iodide are prepared successfully by G. Berg by melting on a water-bath sufficient of the previously prepared mass, consisting of one part gelatin, one part water, and four parts glycerin, adding the prescribed quantity of potassium iodide, stirring until fully dissolved, which is the case in a very short time, and pouring quickly into cold metallic moulds, where the globules solidify almost instantly, while, if the potassium iodide is added in the beginning, and is heated with the gelatin, water and glycerin until the

gelatin dissolves, a pasty mass results, which never hardens. Not more than 0·2 to 0·3 gram of the iodide can be incorporated with a five-gram globule.—*Phar. Zeitung*, April 23.

Preparation of Bitter Almond Water.—H. C. Vielhaber powders ten pounds bitter almonds as finely as possible, separates the fatty oil, which usually amounts to 36 to 38 per cent., by strong pressure, and reduces the almond press-cake to a very fine powder; a quantity of this corresponding to two pounds of almonds is then distilled with water (without alcohol) until about 500 grams of distillate have been obtained, when the receiver is disconnected, another receiver attached and the distillation continued as long as the presence of hydrocyanic acid can be recognized by its odor and taste in the distillate; this second distillate is then used in the place of distilled water for distilling another two-pound lot of the almonds, and the operation continued thus, always collecting the first and second distillates separately and utilizing the latter for distilling the next lot, until all the press-cake has been subjected to distillation; the first distillates are mixed, and also the second. The author thus obtained from 10 pounds of almonds about 5 pounds of first and 9 to 10 pounds of second distillate, the former containing a large percentage of ethereal almond oil, which is dissolved by adding the officinal (Ph. Germ.) percentage of alcohol (about ¼ of its weight) to the distillate. The percentage of hydrocyanic is then determined in the first and second distillates, and sufficient of the latter added to the former to reduce it to the officinal strength.—*Archiv d. Pharm.*, May, 1879, p. 409.

Conditions favoring the Formation of Corrosive Sublimate in Calomel Mixtures.—G. Vulpius finds that:

1. No sublimate forms in the course of twenty-four hours in mixtures of calomel with white sugar, milk sugar, magnesia, carbonate of magnesium and sodium bicarbonate.

2. No such formation takes place in three months in mixtures of calomel with magnesia, magnesium carbonate and sugar.

3. Minute traces of corrosive sublimate are found at the expiration of the same time in a mixture of calomel, bicarbonate of sodium and sugar of milk.

4. A large quantity of corrosive sublimate forms in the same time in a mixture of calomel, bicarbonate of sodium and cane sugar.

5. Calomel powders, containing magnesia or sodium bicarbonate alone, will contain corrosive sublimate, if digested with water.

6. The formation of corrosive sublimate in mixtures of calomel and alkalies digested in water for a short time is not favored, but on the contrary prevented by the presence of hydrochloric acid in the water, the acid neutralizing, to a certain extent, the alkalies which cause the formation.—*Archiv d. Pharm.* April, 1879, p. 347.

Calomel and Iodine.—A dissociation of calomel in corrosive sublimate and mercury and a transformation of the latter, while in a nascent state, into mercury iodide, due to a prolonged contact with greatly diluted iodine vapors, rising from a not hermetically-closed iodine bottle, are reported by Ed. Schaer, who states that the calomel bottle was covered with copious efflorescences of both the bichloride and iodide of mercury.—*Ber. d. Deutsch. Chem. Ges.*, xii., p. 675.

Purification of Carbonic Acid.—After giving all known methods of purification a fair trial, I. Foerster feels satisfied that the process by means of purified charcoal is the best. The carbonic acid gas is passed from the generator first through two wash-cylinders partly filled with a solution of sodium carbonate (1 to 5), then through a third vessel containing freshly powdered charcoal, next through a mixture of coarsely powdered charcoal and water (1 to 3), and finally into the fountain containing distilled water. Mineral water thus prepared is claimed to be free from all unpleasant taste and odor, to keep for a long time and to be far superior to the ordinary kind.—*Pharm. Ztschr. f. Russl.*, April 15, 1879, p. 225.

The Various Disinfectants and their Efficacy have been reinvestigated by E. Reichardt, who considers the use of thymol, creasote, crude carbolic acid, carbolate and chloride of lime, tarry substances, a mixture of three to four parts gypsum and one of iron sulphate, the latter or unslaked lime alone, cleanliness, and whitewashing with lime or a mixture of three parts slaked lime and one chloride of lime, excellent precautions against and preventives of contagious diseases and epidemics, but warns against the addition of organic substances or of iron sulphate to chloride of lime, as recommended by some physicians, claiming that they immediately combine with the free chlorine of the lime, which then in a combined state loses all its efficacy as a disinfectant. The author also strongly advocates the burning of alcohol in

sick chambers, and the building of large fires in the open air for destroying miasmas during epidemics.—*Archiv d. Pharm.*, May, 1879, p. 385.

Solubility of Salicylates.—*Zinc Salicylate.*—According to Dr. Vulpius about four per cent. of this salt will dissolve in water, but such a solution is then over-saturated and a portion will separate on standing; but a solution containing one or two per cent. is permanent. The salt is very soluble in alcohol and ether, and a fifty per cent. alcoholic solution can be diluted with three times its weight of water without precipitating much of the salt.

Copper Salycilate.—Not more than two per cent. is soluble in water; it is readily soluble in alcohol, but not in ether (the latter precipitates it from an alcoholic solution); a concentrated alcoholic solution cannot be diluted with water without precipitating the salt, while a solution of one part of the salt in five of alcohol bears dilution with four times its volume of water without separating.

Atropia Salicylate it readily soluble in alcohol, ether and water, and is even hygroscopic.—*Archiv d. Pharm.*, March, 1879, p. 239.

Solubility of Iodoform.—Dr. Vulpius finds iodoform soluble in six parts of ether at ordinary temperature, while absolute alcohol dissolves four per cent., and glycerin containing very little water dissolves one per cent. at 100°C., more than half of which separates again on cooling; hot olive oil dissolves twenty per cent., eighteen per cent. of which separates on cooling.—*Archiv d. Pharm.*, March, 1879, p. 242.

Note on Hesse's Quinia Test (see "Amer. Jour. Pharm.," March, 1879, p. 135).—When testing pure quinia sulphate in Hesse's quininometer, Chr. Rump noticed that immediately on the addition of the ether an insoluble gelatinous residue remained, which might easily be mistaken for impurities or adulterations; this is prevented, according to the author, by acidulating the mixture previously and then again adding ammonia, when the quinia yields a clear solution with ether.—*Pharm Ztg.*, April 19, 1879, p. 243.

Preparation of Chemically Pure Tartaric Acid.—Oscar Ficinus suggests tartrate of zinc, a not very soluble salt, which is entirely decomposed by sulphuretted hydrogen, as a suitable material for making chemically pure tartaric acid, claiming that the sulphide of zinc,

obtained as a by-product, will not oxidize in the liquid, nor cause impurities in the product, but may be utilized again for generating sulphuretted hydrogen on the addition of hydrochloric acid, and that the zinc chloride obtained in this process will serve for precipitating zinc tartrate.—*Archiv d. Phar.*, April 1879, p. 310.

Solubility of Tartaric Acid in Ether.—Very minute traces of tartaric acid are dissolved, unless the ether contains alcohol, when much more goes into solution; pure ether will extract scarcely any of the acid from an aqueous solution. Dr. Nessler dissolved 0·2 gram tartaric acid in 5 cc. water, which was then shaken repeatedly with 40 cc. ether, when 20 cc. of the decanted etherial liquid contained but 3·93 per cent. of the acid. 0·2 gram tartaric acid and 0·5 gram rock candy were dissolved in water, the liquid evaporated to a syrupy consistence, and after cooling mixed well with 100 cc. ether, when 50 cc. of the decanted liquid yielded on evaporation and examination but 0·0262 instead of 0·1 gram of the acid.—*Ztschr. f. Analyt. Chem.*, 1879, p. 230.

The root of Aconitum heterophyllum is used as an antiperiodic in India. The plant is a native of the high, mild regions of the western Himalaya mountains, principally of Simla, Kaschmir and Kumaon. The root is egg- or spindle-shaped, usually flat at the top and blunt at the bottom, occasionally tapering, externally light yellowish-gray, internally white, 2 to 7 centimeters in length, 6 to 22 millimeters in diameter in the thickest portion, has a bitter, mealy taste, and when subjected to an analysis, by v. Wasowicz, yielded:

1. A soft fat, probably a mixture of olein, palmitin and stearin. 2. Aconitic acid. 3. An acid similar to tannic acid. 4. Cane sugar. 5. Vegetable mucilage. 6. Pectin substances. 7. Atesina, an amorphous, not poisonous alkaloid, previously isolated by Broughton (5 kilograms of the dry root yielded not quite 3 grams of pure alkaloid), and probably another uncrystallizable alkaloid.

The ashes of the root consisted of Al, Mg, Fe, Ka and a trace of Ca, combined with hydrochloric, phosphoric, sulphuric and silicic acid.—*Archiv d. Pharm.*, March, 1879, p. 193.

Tubera Aconiti Japonici.—Two different kinds appear in the market under this name, Aconitum japonicum, *Hort.*, and Aconitum japonicum, *Thunberg*. Seringe considers the former to be a variety of

Ac. variegatum, *L.*; while Siebold considers it identical with his Ac. chinense, and Miquel identical with Ac. Fischeri, *Reichb.*

The second species is considered by Reichenbach to be a cultivated variety of Ac. uncinatum, while Siebold and Miquel claim that it is Ac. lycoctonum, *Lin.*

Tatarinov states that one of the two different species sold in China has the same properties as the root described by Hanbury as Chuen-woo, and is probably identical with it; while the other, known in China as Cao-wu-tu, and called Tsaou-woo by Hanbury, which was recently examined by Paul and Kingzett, was re-examined by Wasowicz, who found it to be more poisonous than the Chuen-woo root.—*Archiv d. Pharm.*, March, 1879, p. 217.

Mexican Sarsaparilla Root and Rhizoma caricis arenariæ.—The former is considered by Prof. Radius not only equal, but even superior to Honduras sarsaparilla, which contains more starch, since the efficacy does not depend on the latter, but on the saponin and small percentage of resin, a larger percentage of both of which is contained in the Vera Cruz (Mexican) root. The author also recommends the so-called German sarsaparilla, the rhizome of Carex arenaria, as an equally efficacious substitute for the Central American sarsaparilla, having at the same time the advantage of being considerably cheaper (in Germany). —*Pharm. Ztg.*, April 19, 1879, p. 243.

Tschuking.—Tschuking, or Zerechtit, the Abyssinian drug, which consists, in Dragendorff's opinion, of the leaves, flowers and fruit of Ubyæa Schimperi, was re-examined by Daniel Oliver, Director of the Herbarium at Kew, who found it to differ greatly from Ubyæa, but to be identical with Artemisia abyssinica.—*Archiv d. Pharm.*, March, 1879, p. 226.

Bernadinit, an interesting new mineral resin sent from San Bernardino, California, is described by Stillman as a light, porous, either white or light yellowish white substance, which floats on water like cork, has a fibrous fracture, presents under the microscope an indistinct structure, apparently consisting of very thin fibres, running in different directions, is readily powdered, has the specific gravity 1·166, softens below 100°C., but does not liquify at 140°C. It is insoluble in water, with which it forms an emulsion when boiled, is soluble in absolute alcohol (hot absolute alcohol dissolved 86·6 per cent.), partially soluble

in ether, colors sulphuric acid reddish-brown when cold, black when heated, and seems to differ from all other minerals; it has not yet been analyzed.—*Ber. d. Deutsch. Chem. Ges.*, xii, p. 567.

Artificial Amber, consisting of copal, camphor, turpentine, etc., possessing one-twentieth the actual value of genuine amber, but resembling it closely in appearance, is used extensively as a substitution for the latter, and may be readily recognized by dipping it into ether, when it loses its polish, becomes sticky, and softens to such an extent that it can be scraped with the finger nail, while the genuine is not at all affected by the ether; if placed on a hot plate the imitation melts much sooner than the genuine.—*Pharm. Ztg.*, April 26, 1879, p. 257.

Japan tallow, or Japan wax, is, according to E. Buri, a mixture of several glycerides, is readily saponified by aqueous alkalies, melts at 52°C., renders water acid when melted with it, is readily soluble in hot commercial absolute alcohol, and crystallizes almost completely from the latter on cooling, contains palmitic acid with at least one fatty acid, having a higher melting point than stearic acid (the author found one, but thinks that more are present), and also a small percentage of an oily acid.—*Archiv d. Pharm.*, May, 1879, p. 403.

ASPHALTUM AND AMBER FROM VINCENTOWN, N. J.[1]

Mr. E. Goldsmith remarked that he had received from Col. T. M. Bryan a specimen of asphaltum, a mass of which, weighing about a hundred pounds, had been found in the ash marl, a layer above the green sand proper, about 16 feet from the surface, in the neighborhood of Vincentown. It seems that this peculiar hydrocarbon had not been observed in the State of New Jersey before; at least no mention of it is made in the geological reports up to 1868. The specimen presented to the Academy had attached on one side a layer of the marl in which it was found. As the material in question is properly considered a mixture of various hydrocarbons, it seems to be obvious that the properties vary according to the predominance of one or the other substance contained therein. This kind is very brittle, black, with a resinous lustre. Its fracture is uneven, inclined to conchoidal; the

[1] From the Proceedings of the Academy of Natural Sciences of Philadelphia; February 25.

streak and powder appear brown. It melts easily in the flame, like wax, and burns with a yellow smoky flame, leaving, after burning, a voluminous coal and but little ashes. In water, alcohol and solution of caustic potassa, it is not soluble. It dissolves in chloroform and in oil of turpentine. In ether it dissolves with difficulty, forming a yellowish-brown solution by transmitted and a dirty greenish solution by reflected light. Oil of vitriol dissolves it into a black liquor, which, when poured into water, shows that a part of the substance is retained in solution, whilst another subsides as a dark-colored powder. Nitric acid reacts on the substance at an elevated temperature, forming therewith soluble products of oxidation.

Not far from the pit from which the asphaltum had been obtained, a a specimen of yellow mineral resin was found. It occurs frequently in the marl of the cretaceous formation, but not regularly; sometimes hundreds of tons may be looked over without finding a single piece; at other times enough has been found to fill a barrel within a day. It is usually known under the name of amber or succinite.

It differed in several particulars from the typical amber found at the bottom and on the coast of the Baltic Sea. Our specimen is lighter than water, whilst the amber from the Baltic is specifically heavier. The latter fuses into a thick sluggish fluid, the Vincentown amber into a very fluid mobile liquid; the cohesion of the Baltic product is stronger than in the specimen in question. These differences indicate its analogy to the variety of succinite called Krantzite by C. Bergeman, who reported its occurrence near Neuberg, Germany.

It melts on heated platium foil into a brown liquid, which runs like water. It takes fire easily, and burns with a yellowish, strongly-smoking flame, leaving but little coal, which rapidly burns away and leaves a small quantity of dark-colored ashes as a residue. Heated in a closed tube, it melts and vaporizes into a gray cloud, which condenses easily into an oily liquid and some small crystals, which are probably succinic acid. The odor of the fumes is strongly penetrating, like acrolein. In water, alcohol or ether it seems to be but sparingly soluble. In chloroform, bisulphide of carbon and in oil of turpentine it dissolves freely. Oil of vitriol makes with it a red solution. Cold nitric acid seems not to affect it much. On warming, the yellowish powder becomes orange-red. It is partly dissolved by caustic potassa. In this yellowish-brown Krantzite Mr. Goldsmith noticed on a fresh fracture

a row of white crystals, arranged in radiating groups. The crystals were too small for mechanical separation, but the opinion was expressed that they were succinellite.

NOTE ON HYRACEUM.

By Wm. H. Greene, M.D., and A. J. Parker, M.D.

Among the native remedies from the Cape of Good Hope, exhibited at the Centennial Exhibition, was a peculiar substance called hyraceum, which was supposed to be the inspissated urine of the Cape Hyrax (*Hyrax capensis*).

The material was obtained from Dr. Leidy, who, in the "Proceedings of the Academy," December, 1876, p. 325, gave a short account of it. According to this account, "the hyrax is reputed to inhabit gregariously rocky places at the Cape of Good Hope, and the accumulated urine in the hollows of rocks, gradually evaporating, is supposed to give rise to the product in question. It is reported as having been employed in medicine with the same effect as castoreum."

Prof. Cope remarked that "a material resembling the concretion made by the urine of the hyrax was found in the fissures of the rocks of New Mexico. It is probably the fecal and renal deposit of the wild rat, *Neotoma*."

About two years ago we made an exhaustive examination of this substance. It is a dark brown, brittle and resinous material, having an aromatic odor and a bitter taste. About 56 per cent. of it is soluble in water, and nearly one-third of the residue from the aqueous extraction is soluble in alcohol, ether and chloroform.

The soluble material amounts in all to about 70 per cent., and the remainder is composed of 14 per cent. of woody fiber and insoluble organic material, and 16 per cent. of sand and other inorganic substances.

On ignition, hyraceum yields about 34 per cent. of ash, which is composed of chlorides, sulphates, phosphates and carbonates of the alkaline metals, and of lime and magnesia. It also contains nitrates in small proportion.

On precipitating the organic material contained in the aqueous extract with lead acetate, and afterwards decomposing the suspended precipitate by means of sulphuric acid, a substance was obtained which

constitutes the greater portion of the organic material soluble in water. It was hard, horny and of a resinous character, transparent, and of a bright-brown tint. It probably consists of several substances, but we were unable to obtain a sufficient quantity for separation, and an ultimate organic analysis. It gives out a fecal odor, and seems to be derived from fecal matter.

The analysis, the details of which are subjoined, shows that the substance is a mixture of various salts and organic matter, the latter constituting about one-half, and containing traces of urea, together with uric, hippuric and benzoic acids. We also obtained from the material a small quantity of a substance having a sweet taste, and which is probably glycocol (?) derived from the breaking up of hippuric into benzoic acid and this substance.

Hyraceum is undoubtedly derived from the urine of some animal, but the large amount of lime (6 per cent.) in proportion to the other salts, and the character of the organic matter contained, indicates that it also contains fecal matter.

Analysis of Hyraceum.—Water, by dessication, 7 per cent.

A microscopical examination revealed nothing of importance. Woody fibers, particles of sand and a general granular appearance were found.

DRIED MATERIAL

Ash,	34·15
Organic substances soluble in water,	37·44
Organic substances soluble in water, alcohol, ether and chloroform,	14·54
Woody fibre and insoluble organic substances; residue,	13·87
	100·00

ASH.

Soluble in water,	19·20
Insoluble in water,	14·95
Potassa,	2·95
Soda,	8·95
Lime,	6·00
Magnesia,	2·10
Iron,	·12
Sand,	2·00
Sulphuric acid,	·60
Carbonic acid,	3·64
Phosphoric acid,	·97
Chlorine,	6·45
Traces of nitric acid, and loss,	·37
	34·15

—*Proc. Acad. Nat. Sci.*, Jan. 28, p. 12.

NOTE ON CALABAR BEANS.

By E. M. Holmes, F.L.S.,
Curator of the Museum of the Pharmaceutical Society of Great Britain.

For some time past there have occurred among the Calabar beans of commerce some specimens which are longer and more cylindrical, and mostly of a redder tint than those generally met with. Only one species of this genus having been hitherto described, my attention was not further attracted by them until recently, when Mr. Carruthers, F.R.S., casually mentioned to me that in the Welwitsch collection, in the British Museum, he believed there was a second species of Calabar bean, which had been described in the "Flora of Tropical Africa,"[1] under the name of *Mucuna cylindrosperma*, Welw. On examining these specimens I found them to be identical with the long cylindrical Calabar beans I had noticed in the drug of commerce. Fortunately pods of the ordinary Calabar bean, as well as of the cylindrical kind, were both to be seen in the Botanical Department of the British Museum, and leaves of the two plants in the Kew Herbarium. The pods of the two plants on comparison were evidently extremely similar, both having a smooth outer layer or epicarp marked with numerous oblique chinks or fissures, about half an inch long, a friable mesocarp, which easily decays and leaves only the veins distinctly visible, and a minutely tuberculated endocarp. The inside of the pod is lined with loose cellular tissue, which looks almost like a very thin layer of wool.

The leaves of the two plants are also very similar, being composed of three stalked leaflets of which the two lateral ones are unequal sided, the side next the centre leaflet being the narrowest. The leaf presents a strong resemblance to the ordinary French bean, except that the leaflets are more cuspidate. The flowers of the species bearing the cylindrical seeds have not been seen, and this fact, taken in conjunction with the similarity of the leaves of the whole group of *Phaseoleæ*, probably led to the plant being placed in the genus *Mucuna*.

Welwitsch describes the plant as a climbing shrub, ascending to a considerable height, with long pendant branches, 30 or 40 feet long, hanging down from the trees which it ascends. It has smooth, herbaceous, shining, ternate leaves, sub-cylindrical pods, 4 to 6 inches long, attenuated both at base and apex, with the surface transversely marked

[1] Oliver's "Flora of Tropical Africa," vol. ii, pp. 186 and 191.

with oblique cracks, and containing two or three, or, more rarely, only one seed. The pods, which ripen in September, dehisce only some time after maturity. When it contains only one seed the pod is almost fusiform, when more than one it is slightly constricted between the seeds, in this respect resembling an ordinary French bean. He gives the native name as "maxima iâ muxito," and the habitat in primeval forests near Sobado-Bango, Aquitamba, Mata irrgeni de Quisuculu and Golungo alto.

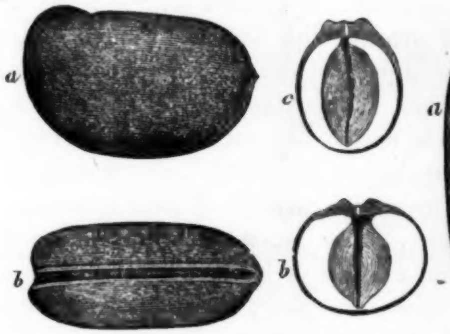
Indeed, his description so closely tallies with that of the true Calabar bean, that were it not for the difference in the stipules—which in the *Mucuna cylindrosperma* are said to be reflexed and persistent, while in *Physostigma venenosum* they are stated to be deciduous—it would be impossible to distinguish between them. Until flowers and further specimens of the two plants are procurable, it would indeed seem somewhat doubtful whether the *Mucuna cylindrosperma*, Welw., is more than a variety of *Physostigma venenosum*, Balf. Until then, it should evidently be placed in the genus *Physostigma*, under the name of *P. cylindrospermum.* The question of identity is also one of some pharmaceutical interest, for the inquiry naturally arises, whether the beans differ in medicinal power?

It has been mentioned to me by Mons. A. Petit, of Paris, that he has found considerable variation in the yield of eserine from different samples of Calabar beans, and that he was puzzled to account for the fact. Knowing that eserine is easily decomposed by alkalies, with a reddish coloration, it occurred to me that a rough test of the presence of that alkaloid in the cylindrical beans might be obtained by the application of liquor potassæ. On touching the cotyledons with this alkali, I was surprised to find that while the true beans gave a permanent pale yellow tint, the cylindrical ones gave a deep almost orange color ultimately turning to a greenish hue with the same reagent, thus apparently indicating greater activity than the ordinary kind. Exactly the same reaction takes place with the cylindrical beans collected by Welwitsch and described in the "Flora of Tropical Africa," under the name of *Mucuna cylindrosperma.* The actual yield of eserine in the two sorts of Calabar bean is now under investigation, and will form the subject of a future communication.

For practical purposes the seeds of *P. cylindrospermum* may be thus

distinguished. The seeds are longer than those of the Calabar bean, nearly cylindrical, of a reddish-brown color, with few exception of a darker hue, and the hilum does not extend quite to the extremity of the bean at the end where the micropyle is visible, but forms there a slight projection, or when the projection is not marked, a portion of the bean about a quarter of an inch in length may be distinctly seen beyond it at that end.

No. 1. No. 2.



No. 1. *Physostigma venenosum*; *a*, showing shape of the seed; *b*, showing the length of the hilum; *c*, transverse section showing cavity between the cotyledons.
No. 2. *Physostigma cylindrospermum*; *a*, showing relative length of hilum; *b*, transverse section, showing different shape of bean.

In the Calabar bean the color is mostly very dark purplish-brown or nearly black. The hilum extends the whole length of the bean, so that neither end of it is visible when the hilum faces the eye, and fragments of the funiculus often remain attached as a whitish line to the edges of the hilum. The seed is also broadest in the middle and tapering towards the ends, and is somewhat flattened at the sides. This character is most easily seen by transverse section, No. 1. *c*.—*Phar. Jour. and Trans.*, May 10, 1879.

The ALKALOIDS of the VERATRUM FAMILY—parts 3, 4.

By C. R. A. Wright and A. P. Luff.

Alkaloids of Veratrum Album.—The authors have examined the alkaloids extracted from 12 kilos of dried roots, by percolating with alcohol acidified by tartaric acid (1 part per 200 of roots), evaporating to a

small bulk, addition of water, filtration from resin, and treating with a slight excess of caustic soda and ether. After repeated washing with ether an insoluble precipitate was left, which seemed to consist principally of a base hitherto undescribed; this the authors name pseudojervia, $C_{29}H_{43}NO_7$. It is snow-white, and melts at 299°, crystallizing anhydrous from alcohol. With sulphuric acid it gives a yellow solution, gradually turning green. The ethereal solution contains, besides small quantities of pseudojervia, several other alkaloids which can be separated by shaking the crude ethereal solution with aqueous tartaric acid and treating the mixed tartrates with soda and a small bulk of ether; a residue is left containing pseudojervia, an amorphous alkaloid, named by the authors veratralbia and jervia. Jervia, $C_{26}H_{37}NO_3$, forms a sulphate almost insoluble in hot and cold water; it crystallizes with 2 molecules of water, melts at 239°, and gives with sulphuric acid the same colors as pseudojervia; the sulphate of pseudojervia is, however, tolerably soluble in water. The second ethereal solution deposits on spontaneous evaporation crystals of jervia mixed with another base, which forms a readily soluble sulphate; this base gives with sulphuric acid a red coloration, hence the authors suggest the name rubijervia. It melts at 237°, and resembles in many respects pseudojervia, forms well crystallized salts, and crystallizes anhydrous as $C_{26}H_{43}NO_2$. The ethereal mother liquor of these crystals dries up to a varnish, consisting chiefly of veratralbia, $C_{28}H_{43}NO_5$; a small quantity of another base is present, yielding veratric acid on saponification; the mixture of veratralbia, and this base is powerfully sternutatory, but this property is lost by boiling with alcoholic potash; hence it is probable that the sternutatory constituent is veratria (Couërbe). Neither jervia, pseudojervia, rubijervia nor veratralbia excite sneezing. Veratralbia gives with sulphuric acid a red coloration, resembling that given by cevadina and veratria. No evidence of saponification or other decompositions was obtained on boiling these bases with alcoholic potash, the minute quantity of supposed veratria excepted.

Alkaloids of Veratrum viride.—On treating about 18 kilos of dried roots precisely as described in the foregoing paper, the first treatment with ether left undissolved some pseudojervia; the tartrates obtained from the ethereal solution yielded no veratralbia, but jervia crystallized out from the second ethereal solution on standing; traces of rubijervia were observed. The ethereal mother liquors dried up to a powerfully

sternutatory amorphous mass, closely resembling the veratralbia similarly obtained from *V. album* roots; it gave on analysis, however, $C_{32}H_{49}NO_9$, the formula of cevadina, and on saponification it yielded about the theoretical quantity of cevadic acid with a trace of veratric acid. The following table represents the approximate yield of the different bases from the two roots per kilo.

	V. album.	V. viride.
Jervia,	1·30	0·20
Pseudojervia,	0·40	0·15
Rubijervia,	0·25	0·02
Veratralbia,	2·20	trace
Veratria,	0·05	less than 0·004
Cevadina,	apparently absent	0·43
	4·20	0·80

The jervia and pseudojervia from *V. viride* agreed in melting-point, properties, analytical numbers, etc., with the specimens obtained from *V. album.*—*Pharm. Journ. and Trans.*, May 31, 1879.

PROCESS FOR THE RAPID ESTIMATION OF MORPHIA IN OPIUM.[1]

BY A. PETIT.

The errors and difficulties inherent to the various processes followed in the estimation of morphia in opium have frequently been pointed out, one of the best grounded objections being certainly that which is based on the length of the various processes. The following method appears to me to exclude most of the causes of the errors noticed by authors; whilst the duration of the experiment, which does not exceed two hours, will facilitate assays and the commercial transactions depending on them, which are often rendered impossible by the length of the analysis.

A comparative investigation of the process now proposed and of that of Guillermond has given results always to the advantage of the new method.

The mode of operating is as follows: Take 15 grams of the opium to be assayed, suspend it in 75 grams of distilled water and afterwards throw it upon a filter. Take 55 grams of the filtrate, which would represent 10 grams of opium, add 3 cc. of ammonia, and agitate.

[1] *Journal de Pharmacie et de Chimie* [4], xxix, 159.

The deposit of morphia takes place rapidly under the form of a crystalline powder. The whole is allowed to stand for a quarter of an hour and then 27 grams of 95° alcohol are added. After shaking several times it is again allowed to stand for half an hour and then thrown upon a tared filter. The alkaloid is washed upon the filter with alcohol of 50°. After washing, it only requires to be dried and weighed. The mother liquors left to themselves deposit after forty-eight hours only a small precipitate that need not be noticed.

With the same opium the following results have been obtained. Ten grams of opium yielded by the—

New Process.	Guillermond's Process.
1·09 of crystalline product.	1·16 } of crystalline product containing much more narcotin.
1·08 " "	0·92 }
1·16 " "	
1·11 " "	
1·06 " "	
1·07 " "	
1·06 " "	

In exact determinations advantage has been taken of the property of narcotin of not saturating acid liquors even in the presence of morphia, the quantity of acid required for the saturation of 25 centigrams of the precipitate obtained being ascertained.

For this purpose 25 centigrams of the precipitate are dissolved in 10 cc. of a solution of sulphuric acid titrated so as to exactly saturate 25 centigrams of pure morphia dried at 120°C. This liquor contains in a liter 4·30 grams of monohydrated sulphuric acid (SO_3,H_2O).

On the other hand a solution of sucrate of lime is prepared of a strength that 10 cc. should saturate exactly 10 cc. of the sulphuric solution. It remains then only to ascertain how much of the sulphuric solution would be saturated by 25 centigrams of the morphia obtained in the various assays.

If the 25 centigrams should saturate exactly the 10 cc. of sulphuric liquid the morphia would be pure; in the contrary case the quantity of real morphia contained in the mixture would be given in hundredths by the number of tenths of cubic centimeters of the 10 cc. of sucrate of lime solution not required, and which remain unused, for the saturation of the 10 cc. of sulphuric solution left unsaturated by the precipitate. In practice, in order to facilitate the solution of the morphia, it is preferable to employ 20 cc. of sulphuric solution to dissolve the

25 centigrams of precipitate, bearing in mind that 10 cc. of sulphuric solution are exactly saturated by the 10 cc. of the sucrate of lime solution.

It has been mentioned that narcotin does not in any way affect the estimation. Therefore, knowing that it required for the saturation of 10 cc. of sulphuric liquid either 10 cc. of the sucrate of lime solution or 25 centigrams of morphia, I dissolved 25 centigrams of morphia and 25 centigrams of narcotin in 20 cc. of the sulphuric liquid and found that in order to saturate the excess of acid there was required exactly 10 cc. of solution of sucrate of lime. Therefore, of the 20 cc. employed, 10 cc. had been saturated by the morphia and 10 cc. left unsaturated by it.

Experiments made with various precipitates obtained gave the following results, 25 centigrams of precipitate being dissolved in 10 cc. of the sulphuric liquid in each case:

No. 1 required 0·7 cc. of sucrate of lime solution to saturate uncombined acid.

No. 2 required 0·9 cc. of sucrate of lime solution to saturate uncombined acid.

No. 3 required 0·6 cc. of sucrate of lime solution to saturate uncombined acid.

No. 4 required 0·8 cc. of sucrate of lime solution to saturate uncombined acid.

The pure morphia present is consequently expressed in the following figures:

No. 1 . .	100 — 7 = 93 per cent.
No. 2 . .	100 — 9 = 91 " "
No. 3 . .	100 — 6 = 94 " "
No. 4 . .	100 — 8 = 92 " "

I would add that by this process the exact proportion of morphia is obtained, whilst by other methods the morphia weighed contains more or less resin or foreign extractive matter.

An analysis of a mixture of morphia and narcotin is easily made by dissolving the morphia in an excess of potash and examining the solution in a polarimeter. Hitherto the coloration of the liquor has prevented me from obtaining satisfactory results in the estimation of opium. But I intend trying whether decolorization with animal charcoal will enable me to solve this problem.—*Pharm. Jour.* [Lond.], May 17, 1879, p. 937.

PARICINE AND ARICINE.

By Dr. O. Hesse.

In reference to the recent letter from Mr. J. E. Howard upon the cinchona alkaloids, I desire to make the following detailed communication upon paricine, with the remark that an abstract of it has already been published in 1877, in the "Berichte der deutschen chemischen Gesellschaft," vol. x., p. 2160.

In obtaining of paricine in 1873[1] I commenced with its nitrate, which, as is known, is precipitated by nitric acid from the sulphuric acid solution of the cinchona alkaloids yielded by *C. succirubra*. But the preparation of the pure alkaloid from the nitrate presents great difficulty, owing to the facility with which it oxidizes. On this account I have abandoned this method of preparing the alkaloid in favor of one based upon another of its properties, namely, that paricine does not neutralize sulphuric acid. If, therefore, a moderately-dilute solution of the entire alkaloids of *C. succirubra* in sulphuric acid be so far neutralized with a concentrated aqueous solution of sodium carbonate that red litmus paper is only just turned blue by it, the paricine is almost entirely precipitated. In order to free the paricine from the last traces of the other alkaloids which adhere to the amorphous precipitate, it is digested at a gentle heat with excess of dilute sulphuric acid, when the paricine is left almost undissolved in the form of sulphate as a yellow mass. After the cooling of the solution this is collected and digested with soda solution, and then the alkaloid is taken up with the smallest possible quantity of ether, in which it is very readily soluble.

The ethereal solution is dark reddish-brown colored, and to it is added small quantities of *pure* light petroleum spirit, which causes the formation of a dark-brown flocculent precipitate that eventually aggregates to a black-brown resinous layer covering the bottom of the vessel. The addition of the petroleum spirit is continued until the solution has only a light-yellow color. After this solution has become clear, it is poured, drop by drop, into a larger quantity of light petroleum spirit, when a yellowish-white flocculent precipitate is formed, which is removed by filtration and washed with pure light petroleum spirit.

This mass is next spread out in the air, in order to free it from adhering petroleum spirit, then again dissolved in a little ether and the

[1] Liebig's "Annalen," vol. clxvi, p. 263.

solution once more mixed with a little light petroleum spirit, by which, as a rule, some dark-colored alkaloid is still separated. The resulting ethereal solution is again dropped into pure light petroleum spirit, when the alkaloid is obtained pure, and only has to be collected.

My attempts to separate the brown resinous substance following the paricine into solution, by means of animal charcoal, turned out completely unfavorable, because the animal charcoal not only takes up this substance, which is a decomposition product of paricine, but also the paricine itself.

The paricine obtained in the above manner is a light, pale-yellow anhydrous powder which melts at 136°C. It dissolves readily in ether, true benzin, alcohol, acetone and chloroform, but is nearly insoluble in pure petroleum spirit, as well as in water.

Its composition corresponds with the formula $C_{16}H_{18}N_2O$. It gave upon analysis as follows:

I. 0·2778 gram, dried at 100°C., gave 0·770 CO_2 and 0.1765 H_2O.

II. 0·2538 gram, dried at 100°C., gave 0·7045 CO_2 and 0·1625 H_2O.

III. 0·2540 gram, dried at 105°C., gave 0·7000 CO_2 and 0·1595 H_2O.

IV. 0·2769 gram, dried at 100°C., gave 0·029737 N.

The formula $C_{16}H_{18}N_2O$ requires.			Found. I.	II.	III.	IV.
C_{16}	192	75·59	75·60	75·70	75·15	—
H_{18}	18	7·08	7·08	7·11	6·98	—
N_2	28	11·02	—	—	—	10·83
O	16	6·31	—	—	—	—

The material used in analysis III. had been precipitated from an acetic acid solution, then dried in the air and finally at 105°C. 0·2623 gram of the air-dried substance gave at this temperature 0·008 H_2O=3 per cent. The formula $C_{16}H_{18}N_2O+\frac{1}{2}H_2O$ requires 3·4 per cent. H_2O.

The alcoholic solution, which as well as the other solutions of paricine is yellow colored, shows, with $p=1$, no action upon the beam of polarized light. The alcohol used was 97 per cent. This solution had a bitter taste and a weak basic reaction.

Paricine, however, is not capable of neutralizing strong acids, as, for instance, sulphuric or hydrochloric acid. With many acids it forms amorphous salts, difficultly soluble in excess of the acid, to which I shall refer subsequently in another place.

With platinum chloride a solution of paricine in hydrochloric or acetic acid gives a yellow amorphous precipitate. This forms after drying in the air a pale-yellow powder, having the composition represented by $(C_{16}H_{18}N_2O,HCl)_2+PtCl_4+4H_2O$. This salt is anhydrous at 100°C.

I. 0·4055 gram of this substance, dried first in an exsiccator and then at 100°C., gave 0.0302 H_2O and upon combustion 0·0800 Pt.

II. 0·6903 gram dried at 130° gave 0·0530 H_2O and upon combustion 0·1363 Pt.

	Calculated.	Found.	
		I.	II.
Pt . .	19·68	19.72	19·61
$4H_2O$ . .	7·26	7·44	7·67

Paricine, as above mentioned, readily undergoes change, leaving a resinous decomposition product. If such a preparation be dissolved in acid and then after treatment with a little animal charcoal precipitated with excess of ammonia, it is then obtained, as a rule, as an earthy grey powder. The paricine exhibited in 1877 at Amsterdam, by the firm of Jobst, of Stuttgart, had been purified and prepared in this manner. At that time 0·2863 of this preparation, dried at 100°C., gave 0·7815 CO_2 and 0·183 H_2O, or 74·44 per cent. C and 7·10 per cent. H; consequently almost the same figures which the alkaloid purified by the above method requires.

As to the occurrence of paricine, I found it first in the bark of *C. succirubra* from Darjeeling, afterwards in almost all the barks of this cinchona cultivated in the East Indies. According to my observations it is contained in the largest quantity in the bark of the most slender branches. The further downwards the bark is collected the less of this alkaloid it contains. In the root bark from Darjeeling I could detect only traces of paricine.

I have besides found paricine in a Columbia bark and *another South American cinchona bark*, which would be placed between the Columbia and Pitayo barks. This second bark contains, besides amorphous alkaloid and some cinchonia and cinchonidia, a large quantity of paricine.

Howard cites an opinion of Gerhardt, according to which paricine would stand in the same relation to aricine as quinoidia does to quinia and cinchonia. This opinion rests upon some experiments made by

Weidenbusch, which were manifestly carried out with impure material. At all events, the results obtained by Weidenbusch are all erroneous from beginning to end, and the speculations connected with them by Gerhardt are worthless.

During my investigations I have not been able to recognize any relation between paricine and aricine. Aricine[1] has a composition essentially different from that of paricine, it corresponding with the formula $C_{23}H_{26}N_2O_4$. It is isomeric with cusconine, and probably also with cusconidine. Under the influence of heat and strong acids aricine is indeed changed into an amorphous alkaloid, though with some difficulty, but this amorphous transformation product possesses other properties and another composition than paricine.

Howard recalls the fact that I have mentioned as being contained in succirubra, besides paricine, two or three basic substances, and he appears to wish to connect these with aricine. These two or three basic substances, however, are derived from the diacid cinchona alkaloids, to which conquinia, cinchonia, etc., belong. Aricine, cusconine, cusconidine, paytine, quinamine, conquinamine and paricine are monoacid alkaloids.

Howard asserts that paricine may be an oxidation product of aricine. This opinion, however, is based only upon a misunderstanding that apparently had its origin in the fact that the substance which Howard has in his collection under the name "aricine," and which, together with its combinations, he has shown to his friends, no doubt contained already-formed paricine. The investigation of this preparation carried out by his nephew, Mr. David Howard,[2] allows me to get a glance—and, indeed, a chemical glance—at it, which tells me that this aricine may be anything else, but not the alkaloid discovered by Pelletier and Corriol. In this, of course, I make the assumption that the alkaloid prepared by D. Howard is, as this chemist states, identical with that prepared by J. E. Howard. This chemist says that the sulphate of his alkaloid did not crystallize from alcohol like the sulphate actually described by Pelletier, and that it probably contained paricine. I have

[1] A specimen of bark containing aricine was about three years since imported into Frankfort. Herr Jobst obtained for me 5 kilos of this bark, the rest came to England. This bark contains 0·62 per cent. of aricine, 0·93 per cent. of cusconine and 0·16 per cent. of cusconidine.

[2] "Pharmaceutical Journal" [3] v., 908.

shown that the hydriodate of aricine crystallizes with extraordinary ease, whilst the hydriodate of the alkaloid prepared and described as aricine by D. Howard does not possess this property.

For several years past "aricine" and its compounds have been shown in many private collections, partly under this name and partly under the name of cinchovatine. All these preparations which I have had the good fortune to be able to examine were, as a rule, mixtures, with homocinchonidine and cinchonidine as the preponderating constituents. The cinchovatine prepared by Winckler, for which I have to thank De Vrij, consisted, on the other hand, almost entirely of homocinchonidine. This alkaloid prepared by Winckler, to which D. Howard also refers in the before-mentioned communication, forms very fine white prisms, but contains, like all specimens of "aricine" examined by me up to the year 1876, no trace of that alkaloid.

In 1877 De Vrij placed at my disposal his whole stock of aricine preparations which he had obtained up to that time, adding that they had not been examined by him. With the exception of two, these preparations fell into the above-named category; *i. e.* they contained homocinchonidine, etc., but no aricine.

One preparation was, on the other hand, actually aricine sulphate. The glass vessel bears the description "Sulfate d'Aricine," and therefore this preparation probably originates from a French manufactory. De Vrij added the remark that at the time (1877) he did not accurately know from whence he had obtained it.

A second preparation corresponded, on the contrary, with the alkaloid described by D. Howard. I have reason to believe that it is a specimen of the substance formerly prepared by Mr. J. E. Howard. De Vrij did not mention his name but only said that he received this aricine about thirty years ago from a friend who had prepared it by precipitation from an aqueous solution of gelatinous sulphate. This preparation is nothing more than impure paricine.

I have formerly shown that quinamine, of which the *C. succirubra* yields a considerable quantity, passes upon treatment with one molecule of SO_3 into protoquinamicine, $C_{17}H_{20}N_2O_2$, and have suggested that probably paricine results from this decomposition product, according to the following equation:

$$\underset{\text{Protoquinamicine.}}{C_{17}H_{20}N_2O_2}+O=\underset{\text{Paricine.}}{C_{16}H_{18}N_2O}+\underset{\text{Formic Acid.}}{CH_2O_2}.$$

This change consequently presupposes oxidation. Mr. Howard appears to consider the formation of paricine as being dependent upon a special tannin, which oxidizes to a red powder and simultaneously draws the crystallizable alkaloids within the sphere of this decomposition. That this hypothesis, put forward by Howard, does not correspond with the facts observed in India is apparent by the examination of the bark of the slenderest branches of *C. succirubra*, since this does indeed contain besides quinamine considerable quantities of paricine, but, on other hand, no trace of the supposed red decomposition product.

With respect to aricine, moreover, Howard thinks that it occurs not pure but impure in *C. succirubra*. Apart from the consideration that this opinion is unintelligible to a chemist, I have no hesitation in stating that I meet with no difficulty in the separation of aricine from a bark that contains it in the so-called impure condition. The fact is that *C. succirubra* does not contain the smallest trace of aricine, even in the impure condition, and that paricine is not a derivative of aricine.

Finally, as Mr. Howard expresses at the close of his communication the hope that shortly he will be able to make a communication upon the properties of aricine through an investigation of the substance, it may also be mentioned that several years ago I published a thorough investigation of aricine and its companion, cusconine, in Liebig's "Annalen," vol clxxxv., pp. 296–323, where all the points were discussed that are requisite for the recognition and characterization of both alkaloids. I do not, therefore, require to make a further investigation of these alkaloids, but I would suggest the carrying out of experiments having for their object the preparation of paricine from quinamine.—*Phar. Jour. and Trans.*, June 7, 1879.

VARIETIES.

Solidago odora as a "Tea" Plant.—At the meeting of the Academy of Natural Sciences of Philadelphia, held January 21st, Mr. Thomas Meehan drew attention to some samples of dried leaves that had been sent for identification, and which are represented to be in extensive use in Berks county, Pa., as a beverage under the name of "Blue Mountain Tea." Mr. Meehan found the leaves to belong to *Solidago odora*. The infusion had a light taste of fennel, by no means disagreeable, but yet with little more attractions than catnip, or any ordinary "herb tea," might present.

Barometer Paper and Sympathetic Inks.—Dr. Bering makes a very delicate reddish barometer paper, turning blue at a slight rise in the temperature, by saturating paper with a solution of cobalt sulphocyanide, made by mutual decomposition between potassium sulphocyanide and cobalt sulphate. Other colors are prepared as follows:

Brown.—Potassium bromide 1 part, copper sulphate 1 part, water 20 parts; mix. This sympathetic ink turns brown on heating.

Yellowish-Green.—Cobalt chromate ½ part, nitric acid and sodium chloride each 1 part, dissolved in 20 parts water.

Yellow.—Dissolve equal parts of cobalt and sodium chloride.—*Apoth. Ztg.*, March 15, 1879, p. 46.

Silvering Solution for Glass.—A solution of 2 grams silver nitrate, 1 gram aqua ammoniæ, 3 grams alcohol and 3 grams water are mixed and the mixture filtered at the expiration of a few hours. Another liquid is prepared by mixing 0·25 gram grape sugar, 8 parts water and 8 parts alcohol, and likewise filtered. The articles to be silvered are then placed into a bath containing equal parts of both clear liquids and heated to 65°C.—*Pharm. Ztschr. f. Russl.*, Feb. 1, 1879, p. 84, from *Metallarb.*

Atramin Ink and Stamping Color.—The following processes are said to yield durable and very cheap black ink:

1. For small quantities: Dissolve 20 grams of atramin in ½ liter of lukewarm water.

2. For large quantities: Mix 3 kilos atramin into a paste with 500 grams hydrochloric acid and a little water. After a few hours, mix well with 1500 grams of glycerin, 1500 grams of a syrup solution of burnt sugar and 50 liters of hot water. Stir occasionally for a day, allow it to stand for 24 hours and decant the clear supernatant liquid.

Office Ink is made in the same manner, except that the quantity of water is increased to 75 or 80 liters.

School Ink is the preceding kind, to which are added the washings of the residue obtained with about 5 liters of hot water.

Durable Stamping Ink is made by triturating sufficient atramin in a mortar with boiling water into a uniform thick paste, heating and adding the same quantity of glycerin as atramin.—*Pharm. Ztg.*, March 19, 1879, p. 174.

AMERICAN PHARMACEUTICAL ASSOCIATION.

The twenty-seventh annual meeting will be held in the city of Indianapolis, Indiana, on the second Tuesday in September (being the 9th day of September), 1879, at 3 o'clock P. M.

Arrangements are being made by the pharmacists of Indianapolis to get a reduction of fare from all points of the United States and Canada, and there will, no doubt, be a large gathering.

Indianapolis is of easy access from all parts of the country, a great railroad centre, and pleasantly located. Our friends in the West will give us a hearty welcome and try and make our stay as enjoyable as possible.

It has been some years since the Association held its meeting in a western city, and we may count upon large accessions to our membership. It is also expected that a large number of our friends from the South and Southwest will avail themselves of this opportunity to attend the meeting, who were unable to be present at the Atlanta meeting in consequence of the postponement of the same, or the unavoidable cause arising from the then but recent afflictions of the Mississippi Valley.

Mr. Eli Lilly, the local Secretary at Indianapolis, will be pleased to correspond with exhibitors or receive articles for exhibition and make arrangements for the display of the same.

The chairmen of committees, and all members who have accepted queries, or who have observations to communicate, are requested to have their reports ready at the first session, and to communicate with the Committee on Papers and Queries.

Particular attention is directed to the still incomplete centennial fund. The contributions to this fund have been very limited by the members, and yet it is one of great importance to the Association, as well as to researches of science. Let every member of the Accociation, and local Pharmaceutical Associations as a body, contribute something to this fund, and it will be a lasting monument to the American Pharmaceutical Association, to the generosity of the druggists of Philadelphia, and to the members of this Association.

G. J. LUHN, *President.*

Charleston, S. C., June 10th, 1879.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

New Jersey Pharmaceutical Association.—The ninth annual meeting convened at Princeton on Wednesday, May 21st, 1879. Under the direction of the Committee on Arrangements a preliminary meeting took place in the parlor of the University Hotel, to receive an address of welcome from the Rev. James McCosh, D.D., LL.D., President of the College of the State of New Jersey. After the address the Association marched from the hotel to the Department of Physical Sciences of the College, where the annual meeting was held.

The meeting was called to order at 12 M. by the President, Randal Rickey. After his address the following officers were elected for the ensuing year:

President, A. S. White, Mount Holly; Vice-Presidents—Wm. M. Townley, Newark; James C. DeCou, Trenton; Treasurer, Wm. Rust, New Brunswick; Recording Secretary, A. P. Brown, Camden; Corresponding Secretary, R. W. Vanderwort, Newark. Standing Committees—Wm. M. Townley, *ex officio*; H. P. Thornn, Medford; Bunting Hankins, Bordentown; Wm. B. McGinness, New Brunswick; Arthur Smith, Belvidere.

A recess was then taken until 3 o'clock, during which the Association partook of a handsome collation at the University Hotel, provided by the Committee on Arrangements. After the collation the members were invited to the front of the hotel where they were photographed in a group. The Association then made a tour of the buildings and grounds, under the guidance and direction of Dr. McCosh,

visiting the President's house and the observatory of Prof. Young. Many rare and interesting forms of apparatus were shown in the various departments of the college, and were courteously exhibited and explained by the different Professors in attendance. The visits to the Library and to the Museum were especially interesting. In the evening an illustrated lecture was delivered before the Association in the Museum of the College by T. Chapman Hill, A.M., on Insects. Tuesday morning was devoted to reading answers to queries and volunteer papers. Taking it all together, it was one of the most interesting meetings of the Association.

Pennsylvania Pharmaceutical Association.—In accordance with the arrangements made by the Secretary, Dr. J. A. Miller, of Harrisburg, most of the members from the eastern section of the State took the fast day train, crossing the Alleghenies just before dusk, and arriving in Pittsburg shortly before midnight on the evening of June 9th, where they were received by a committee of the Pittsburg druggists and conducted to the quarters prepared for them. The remaining members from the eastern and from other parts of the State arrived early on Tuesday morning.

The meeting was held in the Select Council Chamber, the first session being called to order by President Heinitsh at 10.20 A. M. Addresses of welcome were delivered by Dr. L. H. Harris, of Pittsburg, on behalf of the druggists and pharmacists, and by John Coyle, Esq., on behalf of the Mayor, who was absent, to both of which the President responded.

A large number of applications for membership were reported during the morning by Mr. Meyers, of the Executive Committee, and the applicants were duly elected.

The President delivered his annual address, in which he made various suggestions having in view increased facilities for the transaction of business and for enlarging the usefulness of the Association. The address was referred to a committee consisting of Messrs. Remington, Zeller and Ziegler, to report thereon at the next session.

Reports were read and received from the Secretary and Treasurer, the Executive Committee, the Committee on Certificate of Membership, the Delegates to the Twenty-sixth Annual Meeting of the American Pharmaceutical Association and from the Committee on Papers and Queries. The Treasurer's report was referred to an auditing committee consisting of Messrs. Harris, Horn and Abel. The certificate of membership was adopted as recommended, and the committee continued for the purpose of making the necessary contract and having it executed. The price of the certificate to members was subsequently fixed at $3.00, which barely covers the cost. On the motion of Messrs. Maisch and Lemberger the list of queries was directed to be printed separate from the proceedings and a copy thereof to be furnished to each member.

A committee of five for the nomination of officers was appointed as follows: Messrs. Maisch, Ross, Hays, Zeller and Harris; and, on motion, the officers were directed to device and procure a seal, which is to be the seal of the Pennsylvania Pharmaceutical Association.

Prof. Maisch referred to the decennial revision of the United States Pharmacopœia, and endeavored to show the necessity for pharmacists outside of the large cities participating in this work by furnishing drugs and preparations used in their localities, and by criticizing old processes in accordance with their observations. He offered the following, which after some discussion was unanimously adopted:

Resolved, That a committee of ten members be appointed whose duty it shall be to submit the present United States Pharmacopœia to as careful a revision as can be done during the present year, and that the result of their labors be communicated to the President of the Association on or before the 15th day of January 1880. That these reports be properly arranged under the direction of the President, and attested by the Secretary, and over the seal of the Association, be presented to the decennial convention which is to meet in the city of Washington, D. C., the first Wednesday of May, 1880, as the contribution of the Pennsylvania Pharmaceutical Association toward the revision of our national Pharmacopœia.

The committee was subsequently appointed as follows:

Charles T. George, of Harrisburg; Chas. H. Cressler, of Chambersburg; W. F. Horn, of Carlisle; Jos. L. Lemberger, of Lebanon; G. W. Kennedy, of Pottsville; E. T. Meyers, of Bethlehem; W. S. Zeller, of Bellefonte; Lewis Emanuel, of Pittsburg; S. W. W. Schaffle, of Lewisburg, and Wm. Harris, of Hamburg.

Prof. Debrunner, of Pittsburg, read an interesting paper on the history of poisons, which was accepted and referred.

The second session was held at 3 o'clock. After the reading and approval of the minutes the Committee on Nominations reported that the Association had good cause to feel gratified at having had since its organization such a very efficient corps of officers, who have well managed the affairs of the Association. In the opinion of the committee it is desirable that the offices should continne to rest in the same safe hands for another year. The only changes they deemed advisable for the present is the placing of a representative man from the western portion of the State among the list of officers, and not to make a nomination for Assistant Secretary until after the suggestions of the President shall have been acted upon, recommending the appointment of this officer from the place where the next meeting is to be held. The committee recommended the following:

President, Charles A. Heinitsh, Lancaster; First Vice-President, Geo. W. Kennedy, Pottsville; Second Vice-President, George A. Kelly, Pittsburg; Secretary, Jacob A. Miller, Harrisburg; Treasurer, Joseph L. Lemberger, Lebanon; Executive Committee—Charles H. Cressler, Chambersburg; J. A. Meyers, Columbia; W. F. Horn, Carlisle.

The report was adopted, and the officers were duly elected.

The Committee on the President's Address reported in favor (1) of electing the Assistant Secretary from the place of the next annual meeting; (2) of publishing the Proceedings of the Association from its inception; (3) of appointing a committee on adulterations and sophistications, and (4) of appointing a committee on legislation and trade interests. The recommendations were adopted, and after the reading by Dr. Ross of the report on legislation concerning Pennsylvania laws affecting druggists, the chair appointed Messrs. Miller (of Harrisburg), Jos. Abel (of Pittsburg) and Kennedy (of Pottsville) the Committee on Adulterations; and Messrs. L. H. Harris (of Pittsburgh), W. H. Egle (of Harrisburg), Henderson (of Pittsburg), Parry (of Lancaster), Burns (of Minersville), Thompson (of Danville),

Hays (of Shippensburg) and Stein (of Reading) the Committee on Legislation and Trade Interests.

Mr. Kennedy showed a sample of *sulphate of sodium*, obtained as a by-product in the manufacture of carbonic acid water (soda water), the cost of which is thereby somewhat lessened. The same gentleman also read a paper on *Aspidium marginale*, reporting favorable results with the oleoresin in expelling tænia, and confirmatory remarks on the same subject were made by Prof. Maisch.

Mr W. F. Horn read a paper on the preparation of *phosphoric acid*, advocating a plan similar to that of Prof. Markoe, using, however, a small quantity of iodine, and discarding the use of bromine altogether.

Mr. Lemberger exhibited seven samples of *resin of podophyllum*, and called attention to the difference in color and the causes to which this is due.

Prof. Remington exhibited a *pharmaceutical still* (see May number, p. 225), and explained its arrangement.

Prof. Maisch exhibited a number of *drugs*, some of them rare or recently introduced, and others to show their handsome preservation. Jaborandi, boldo, Strychnos tieute, Str. potatorum, Berberis nervosa, Eriodictyon glutinosum, Diospyros kaki, Aralia papyrifera, Zizyphus vulgaris, the fruit of Myroxylon pereiræ and the white balsam expressed from it; Abrus præcatorius (seeds and root), handsome augustura bark, nutmegs with mace, and others.

The following delegates to the next meeting of the American Pharmaceutical Association were elected: Charles H. Heinitsh, Lancaster; Dr. George Ross, Lebanon; George A. Kelly, Pittsburg; William Harris, Hamburg; W. F. Horn, Carlisle.

A committee, consisting of Messrs. Maisch, David Horn and John B. Raser, reported in favor of holding the next annual meeting at Allentown on the second Tuesday of June, 1880. The report was adopted. Mr. Chas. Klumpp was elected Assistant Secretary; and, after transacting some routine business, the Association adjourned.

The Pittsburg College of Pharmacy tendered a steamboat excursion to the members of the Pennsylvania Pharmaceutical Association and their ladies. The company embarked on the steamer "Chartiers Valley," and proceeded up the Allegheny river to the cork factory of Armstrong Bros. & Co., which was thoroughly inspected. The steamer afterwards landed near Saw Mill Run, where a large number ascended the inclined plane to Duquesne Heights. Subsequently the steamer proceeded up the Monongahela river to Braddocks, where a train of cars was in waiting to convey the party to the Edgar Thompson Steel Works, where the manufacture, casting and finishing of Bessemer steel was witnessed. On the return trip, the "City Farm" (poorhouse) was visited, and at 7 o'clock the steamer arrived at her landing in Pittsburg.

At 9 o'clock the same evening, the members and ladies assembled at the Seventh Avenue Hotel, again as the guests of the Pittsburg College of Pharmacy, and sat down to the bountiful banquet provided for the occasion, which was heartily enjoyed by all, and was enlivened by music, toasts and speeches.

During the night and following morning most of the visitors left, a small party returning East by way of the oil regions, receiving at Oil City the attentions of their fellow member A. R. Griffith, who conducted them to the various places of interest in that interesting neighborhood.

The success of the second annual meeting of the Pennsylvania Pharmaceutical Association is largely due to the exertions of its officers, and to the kind and efficient co-operation of the Pittsburg College of Pharmacy. The interest awakened promises to be lasting and fruitful of good results.

Trade Association of Philadelphia Druggists.—This is the title of an association organized at meetings held at the Philadelphia College of Pharmacy on May 27th and June 5th, the object being "the promotion of the general welfare and protection of the material interests of the trade in all its branches." Any person may be eligible to membership who is engaged in the retail or wholesale drug, paint and medicine business, manufacturing chemists and co-ordinate branches of the drug trade, and those who having received a druggist's education feel interested in the welfare of the profession. Mr. Caleb H. Needles was chosen president, Thos. S Wiegand secretary, and C W. Hancock treasurer, and an executive committee was appointed representing each of the thirty-one legislative districts.

In view of the fact that objectionable measures are not unfrequently introduced into the State Legislature, such an organization would seem to be a necessity, and if it can harmonize its action, whenever such becomes necessary, with that of the committee of the Pennsylvania Pharmaceutical Association, which has similar ends in view, the druggists of the State are not likely to suffer from unjust legislation without having been heard.

The objects, as quoted above from the call for the meeting, are very comprehensive, and besides the legislative feature may perhaps be intended to include dealing with such evils as are known to exist to a greater or less extent in large cities, like the "cutting" of prices, the lowering of strength of officinal preparations, the substitution of cheap for high-priced medicines, the percentage business, the writing of prescriptions in ciphers or factitious names, the starting of drug stores merely for the purpose of disposing of them as soon as possible, and perhaps others. An organization for the protection of the material interests certainly deserves the hearty co-operation of all engaged in business.

Kentucky Pharmaceutical Association.—The second annual meeting was held in the hall of the Louisville College of Pharmacy, on Wednesday, May 21st, President W. H. Averill, of Frankfort, in the chair. In his annual address the President spoke at some length of the objects and importance of the Association to the members, as well as to the general public, and recommended that some action be taken to secure a more general pharmacy law than that at present on the statutes.

Reports were also received from the Treasurer, the Secretary, Executive Committee, Committee on Legislation, the Delegation to the last Meeting of the American Pharmaceutical Association, and the Special Committee on By-Laws, all of which were appropriately disposed of. On motion, the President was requested to send a telegram to the convention of druggists and pharmacists at Utica, N. Y., conveying hearty wishes for their success in organizing the New York State Pharmaceutical Association.

At the second session, held on Thursday, the consideration of and action upon the reports was continued. Invitations to visit several industrial establishments were received and accepted. A number of queries for investigation were read and accepted for report at the next annual meeting.

The following officers for the ensuing year were elected: Vincent Davis, of Louisville, President; M. H. Webb, of Simpsonville, E. C. Reiss, of Covington, J. Colgan, of Louisville, O., Vice Presidents; W. G. White, of Richmond, Recording Secretary; C. Lewis Diehl, of Louisville, Corresponding Secretary; Peter Nodler, of Covington, O., Treasurer.

The next meeting will be held at Owensboro' in the month of May, 1880.

On the evening of Thursday, the members were the guests of the pharmacists of Louisville at a pleasant reunion at Rufer's Hotel.

Cincinnati College of Pharmacy.—The following gentlemen received the degree of Graduate in Pharmacy at the Commencement, held March 19th:

Emanuel Goodman, Cincinnati, O. (*The Balsam Compounds*); J. Peter Heister, Cincinnati, O. (*Artesian Well Water*); Phillip Hoglan, Newcomerstown, O. (*The Pharmacist*); Frank T. Johnson, Bucyrus, O. (*Berberis aquifolium*); Ferdinand Kinzbach, Cincinnati, O. (*Gamboge*); Louis Klayer, Cincinnati O. (*Euphorbia Americana* [*American Ipecac*]); Charles A. Lehrer, Sandusky, O. (*The Scale Compounds of Iron*); B. H. Overbeck, Cincinnati, O. (*Helonias dioica, with approximate analysis*); Ernst A. Pohlmeyer, Cincinnati, O. (*Glycerin*); Sebastian Scheffner, (*The Balsam of Liquidambar Styraciflua*); Herman Serodino, Jr, Cincinnati, O. (*Ricinus Communis*); Chas. A. Stammel, Cheviot, O. (*Specific Gravity*); William H. Sudhoff, Richmond, O. (*Senna*).

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Long Life and How to Reach It. By Jos. G. Richardson, M.D., Professor of Hygiene in the University of Pennsylvania. Philadelphia: Lindsay & Blakiston, 1879. 16mo, pp. 160. Price 50 cents.

This is the second of the series of "American Health Primers," the publication of which we announced in our last number, p. 334. It discusses the causes of disease, heat and cold, contagion, clothing, air, water, baths, dwellings, food and drink, exercise, sleep, mental power, etc., and is written in an instructive and entertaining manner, which will commend itself to every intelligent reader.

Elements of Modern Chemistry. By Adolphe Wurtz, Member of the Institute, etc. Translated and edited, with the approbation of the author, from the fourth French edition, by Wm H. Greene, M.D., formerly Demonstrator of Chemistry in Jefferson Medical College, etc. Philadelphia: J. B. Lippincott & Co., 1879. 12mo, pp. 687.

Although there is no lack of elementary treatises on chemistry, we believe that the editor has done good service in making this work of the celebrated French chemist accessible to the American student. It opens in an introductory chapter with the consideration of the physical and chemical forces, the various chemical laws, nomenclature and notation, and proceeds then to the various elements, commencing with the non-metallic in the following order: hydrogen, oxygen, sulphur, selenium, tellurium, chlorine, bromine, iodine, fluorine, nitrogen, phosphorus, arsenic, antimony, boron, silicon and carbon. Next the theory of atomicity is explained, which is followed by a chapter on the general characters of the metals and their compounds, and by the description of the various metals. This completes the inorganic chemistry, which occupies 398 pages.

The remainder of the volume is devoted to organic chemistry, the descriptive portion being preceded by a chapter on elementary analysis and a concise but full account of the theories relating to the constitution of the organic compounds. The latter are grouped together as compounds of cyanogen, monatomic alcohols and their derivatives, diatomic alcohols or glycols, alcohols of higher atomicity, aromatic compounds, natural alkaloids, albuminoids and the more important products of disassimilation of the animal economy.

The work is embellished with 132 illustrations, mostly of lecture experiments and of industrial processes, and with a colored plate illustrating spectrum analysis.

We consider this work admirably adapted for a text-book and well calculated to create in the student a love for chemistry, surrounding as it does the dry facts with judiciously selected experiments and with interesting accounts of the application of chemical laws. In addition to this, the book is well printed, the arrangement of the text is very convenient, and, in short, both the editor and the publishers have done their part well to make it useful as well as attractive.